BU6.. Series Butterfly Valves, Wafer or Lug Pattern

2-way Butterfly Valves flanged

DN50...500

For Open/Close or modulating control of cold and hot water.

Applications

Typical applications include chiller isolation, cooling tower isolation, change-over systems, air handling unit, fan coil control, bypass and process control.

Technical data

Flow medium	Nylon coated disc: Cold and hot water
	SS304 disc: cold and hot water. Max. 50% Glycol
Temperature of medium	Nylon-coated disc: 0...+95°C
	SS304 disc: -20...+100°C
Nominal pressure	1600kPa (PN16)
Flow characteristic	Modified equal-percentage
Rangeability	10:1 (for 30°... 70° range)
Leakage rate	Rate A Bubble Tight (ISO 5208)
Pipe connections	ISO 7005.2, AS2129
	PN10/16, Table E for wafer (DN50..300)
	PN16 for wafer (DN350...500)
	PN16 for lug (DN50...500)
Max. Close-off pressure	1200kPa
Installation position	Vertical to horizontal
Maintenance	Maintenance-free
Angle of rotation	90° rotation
Valve Material	
Body	Ductile cast iron GGG40 (DN50...500)
Disc	Nylon coated ductile cast iron disc / Stainless steel 304 disc
Seat	EPDM
Shaft	Stainless steel 416
Bushing	RPTFE

Ordering sample

BU6 125 L / GR230A-7

Actuator:	GR230A-7 actuators, Open/Close, AC 100...240V
Default:	Only SY Actuators and its Butterfly Valves are pre-calibrated and pre-assembled in the factory
Package:	"/" Valve and actuator supplied separately on request
Disc and flange* pattern:	L(X)-Lug, Nylon coated disc default(X)-Wafer, Nylon coated disc LS(X)-Lug, stainless steel disc S(X)-Wafer, stainless steel disc
Size:	DN125
Butterfly Valve:	BU6.. Low torque series

*** BU6200X/LX, BU6200SX/LSX is utilised at 600kPa only.**

Product features

The modified equal-percentage flow characteristic and the large Kv values provide an economical control valve solution.

Mode of operation

The BU6.. series Butterfly Valves are operated by General Rotary Actuators, Mechanical Fail-Safe Rotary Actuators or SY Large Torque Multi-function Actuators are available. Select the actuators according to required Close-off pressure and HVAC condition of installation. The actuators are controlled by a standard Open/Close or modulating control system and rotate the disc of the valve to the position dictated by the control signal.

Manual operation

The manual operation is available by using a lever with manual override button of SR.., GR.., DR.. actuator pressed or turning a handwheel of actuators.

UL marked actuators is optional, please contact your local Sales Representative for details.

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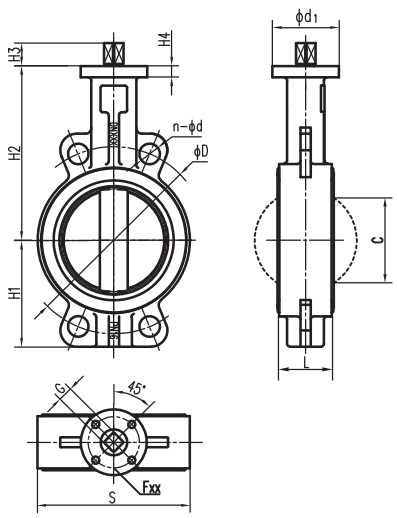
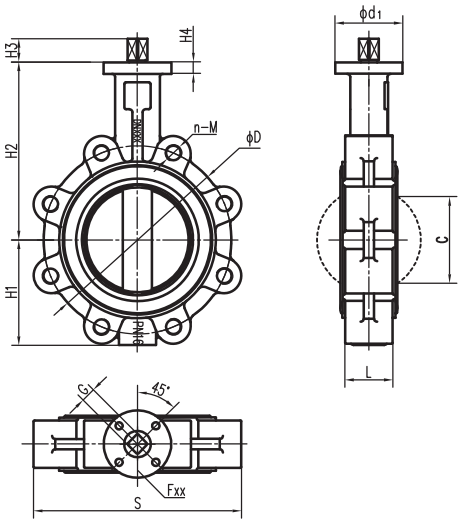
Wafer connection



Lug connection



Dimensions of PN10/16, Table E wafer connection Butterfly Valve [mm]

Type	Size	Top flange	L	C	S	H1	H2	H3	H4	G	ød1	PN10		PN16		Table E		NC BFV (kg)	SS BFV (kg)
												øD	n-ød	øD	n-ød	øD	n-ød		
BU650..	DN50	F05	43	33	118	65	130	13	9	14	65	125	4-18	125	4-18	114	4-18	2.0	2.0
BU665..	DN65	F05	46	48	135	71	143	13	9	14	65	145	4-18	145	4-18	127	4-18	2.4	2.4
BU680..	DN80	F05	46	66	149	92	155	13	9	14	65	160	8-18	160	8-18	146	4-18	2.8	2.7
BU6100..	DN100	F05	52	91	150	104	170	13	11	14	65	180	8-18	180	8-18	178	8-18	4.3	4.1
BU6125..	DN125	F07	56	115	176	118	190	19	13	17	90	210	8-18	210	8-18	210	8-18	6.6	6.2
BU6150..	DN150	F07	56	142	204	132	210	19	13	17	90	240	8-22	240	8-22	235	8-22	7.7	7.6
BU6200..	DN200	F07	60	194	260	167	243	19	15	17	125	295	8-22	295	12-22	292	8-22	13.3	12.0
BU6250..	DN250	F10	68	245	316	198	282	24	17	22	125	350	12-22	355	12-26	356	12-22	20.9	19.7
BU6300..	DN300	F10	78	294	372	231	310	24	17	22	125	400	12-22	410	12-26	406	12-26	28.9	31.0
BU6350..	DN350	F10	78	328	422	256	345	24	20	22	125	-	-	470	16-26	-	-	42.5	41.1
BU6400..	DN400	F14	102	374	473	294	377	38	21	36	175	-	-	525	16-30	-	-	63.7	65.9
BU6450..	DN450	F14	114	425	526	337	422	38	21	36	175	-	-	585	20-30	-	-	80.1	82.2
BU6500..	DN500	F14	127	472	582	375	466	38	22	36	210	-	-	650	20-33	-	-	107.5	104.4

Dimensions of PN16 lug connection Butterfly Valve [mm]

Type	Size	Top flange	L	C	S	H1	H2	H3	H4	G	ød1	PN16		NC BFV (kg)	SS BFV (kg)
												øD	n-M		
BU650L..	DN50	F05	43	33	115	65	130	13	9	14	65	125	4-M16	2.5	2.5
BU665L..	DN65	F05	46	48	132	71	143	13	9	14	65	145	4-M16	3.1	3.1
BU680L..	DN80	F05	46	66	175	92	155	13	9	14	65	160	8-M16	4.2	4.1
BU6100L..	DN100	F05	52	91	195	104	170	13	11	14	65	180	8-M16	5.9	5.7
BU6125L..	DN125	F07	56	115	240	118	190	19	13	17	90	210	8-M16	8.1	7.8
BU6150L..	DN150	F07	56	142	257	132	210	19	13	17	90	240	8-M20	9.7	9.1
BU6200L..	DN200	F07	60	194	318	167	243	19	15	17	125	295	12-M20	16.8	15.5
BU6250L..	DN250	F10	68	245	383	198	282	24	17	22	125	355	12-M24	26.1	23.9
BU6300L..	DN300	F10	78	294	435	231	310	24	17	22	125	410	12-M24	34.9	37.0
BU6350L..	DN350	F10	78	328	512	256	345	24	20	22	125	470	16-M24	54.5	53.1
BU6400L..	DN400	F14	102	374	590	294	377	38	21	36	175	525	16-M27	81.7	83.9
BU6450L..	DN450	F14	114	425	640	337	422	38	21	36	175	585	20-M27	108.1	110.2
BU6500L..	DN500	F14	127	472	703	375	466	38	22	36	210	650	20-M30	153.3	154.1

UL marked actuators is optional, please contact your local Sales Representative for details.

- General Large Torque Actuators for operation of:
- Torque:
- Open/Close or 3-point control:
- Modulating control:

DN50...600 Butterfly Valves
35...3500Nm
SY...24-3-T, SY...230-3-T
SY1U24-SR-T, SY1U230-SR-T
SY...U24-MF-T, SY...U230-MF-T

Technical data

Nominal voltage	AC 24V ± 10%
SY...-3-T, SY...-SR-T	AC 230V ± 10%
Nominal voltage range	AC 21.6...26.4V
SY...-3-T, SY...-SR-T	207...253V
Connecting cable	½" cable connector, screw terminals
Motor protection	H class insulation (SY1), F class insulation (SY2...12)
Gear train	High alloy steel gear sets
Control signal Y	DC (0)2...10V
Sensitivity	200mV
Position feedback signal U	DC (0)2...10V
Angle of rotation	Electrically limited to 90°, Max. 95° for manual operation
Position indicator	Top mounted domed indication
Auxiliary switches	2xSPDT 3A, AC 230V(SY1); 2xSPDT 5A, AC 230V(SY2...12)
Ambient temp.	-20...+60°C
Humidity	5...95% RH, non-condensing
Degree of protection	IP67
Housing material	Die Cast Aluminium Alloy
EMC	CE according to 2004/108/EC
Low voltage directive	CE according to 2006/95/EC

* MP-T models available on request

Model No.	Nominal Torque (Nm)	Motor power		Running time			Running current		Manual override	Weight (kg)	Mounting flange
		AC 24V	AC 230V	AC 24V	AC 230V		AC 24V	AC 230V			
					50Hz	60Hz					
SY1..	35	10W	10W	15s	13s	12s	0.6A	0.3A	by 8mm Wrench	2	F05
SY2..	90	70W	40W	15s	17s	15s	3.0A	0.5A	Handwheel	11	F07
SY3..	150	70W	40W	22s	26s	22s	3.0A	0.5A	Handwheel	11	F07
SY4..	400	180W	120W	16s	18s	16s	6.0A	0.6A	Handwheel	22	F10
SY5..	500	180W	120W	22s	25s	22s	6.5A	0.7A	Handwheel	22	F10
SY6..	650	/	120W	/	31s	28s	/	0.8A	Handwheel	22	F10
SY7..	1000	/	180W	/	55s	46s	/	1.6A	Handwheel	36	F14
SY8..	1500	/	220W	/	55s	46s	/	2.0A	Handwheel	36	F14
SY9..	2000	/	180W	/	70s	58s	/	1.6A	Handwheel	56	F16
SY10..	2500	/	220W	/	70s	58s	/	2.0A	Handwheel	56	F16
SY11..	3000	/	250W	/	70s	58s	/	1.6A	Handwheel	56	F16
SY12..	3500	/	300W	/	70s	58s	/	2.2A	Handwheel	56	F16

Product Feature

Electrical connections All actuator control elements are wired to a terminal strip under the main cover. Remove the cover and insert the cables through the cable connector in order to reach the terminal strip. The connectors should be made according to the diagram. Before beginning this procedure, make sure that the power supply voltage is in accordance with the actuator's name plate. After the terminal connections have been made, move the actuator manually to the half-open position and make a preliminary check of the wiring.

Overload protection If the real running torque exceeds the nominal torque, the overload protection will be functioned to prevent the motor overload.

Manual operation The manual operation is available by turning a handwheel of actuators (SY2...12) and using a 8mm wrench for SY1.

UL marked actuators is optional, please contact your local Sales Representative for details.

Ordering sample

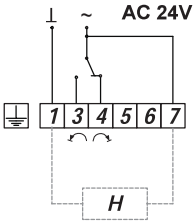
SY4 U230 -MF -T

With terminal only	eg.Modulating control
"-MF/SR": Modulating control	SY2U230-MF-T
"-3": Open/Close or 3-point control	Open/Close, 3-point control
"U24": 24V nominal voltage (modulating)	SY2-230-3-T
"U230": 230V nominal voltage (modulating)	
"-24": 24V nominal voltage (Open/Close, 3-point)	
"-230": 230V nominal voltage (Open/Close, 3-point)	
Model number	

Wiring diagrams

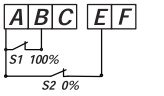
SY..-24-3-T Open/Close or 3-point control

Notes:
- Connection via safety isolating transformer.
- Relays are needed in parallel connection of several actuators
- "L" cannot be connected to terminal #3 and #4 simultaneously.
- 30% duty cycle.

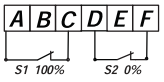


#1	Power supply Com/Neutral
#3	Power supply Hot line for Open
#4	Power supply Hot line for Close
#5	Connect to Com/Neutral for fully open indication
#6	Connect to Com/Neutral for fully close indication
#7	Heater

Auxiliary switch



SY1-24-3-T

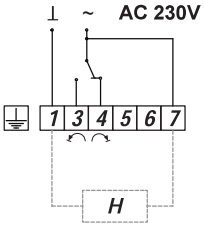


SY(2...4)-24-3-T

SY..-230-3-T Open/Close or 3-point control

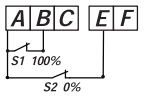
WARNING! Leakage current is possible (<3.5mA)! Connect the earth first before applying any supply voltage! Disconnect the supply voltage before the earth!

Notes:
- Caution: Power supply voltage!
- Relays are needed in parallel connection of several actuators
- "L" cannot be connected to terminal #3 and #4 simultaneously.
- 30% duty cycle.

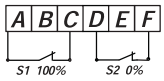


#1	Power supply Com/Neutral
#3	Power supply Hot line for Open
#4	Power supply Hot line for Close
#5	Connect to Com/Neutral for fully open indication
#6	Connect to Com/Neutral for fully close indication
#7	Heater

Auxiliary switch



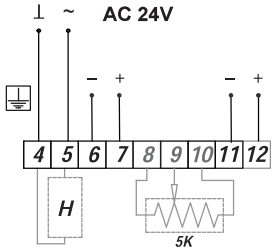
SY1-230-3-T



SY(2...12)-230-3-T

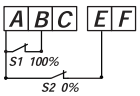
SY1U24-SR-T Modulating control

Notes:
- Connection via safety isolating transformer.
- Power supply Com/Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.



#4	Power supply Com/Neutral
#5	Power supply Hot line
#6	Control signal -
#7	Control signal +
#8	For actuator internal use
#9	For actuator internal use
#10	For actuator internal use
#11	Feedback signal -
#12	Feedback signal +

Auxiliary switch



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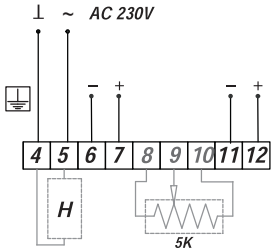
Wiring diagrams (continued)

SY1U230-SR-T

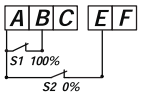
Modulating control

Terminal

#4	Power supply Com/Neutral
#5	Power supply Hot line
#6	Control signal -
#7	Control signal +
#8	For actuator internal use
#9	For actuator internal use
#10	For actuator internal use
#11	Feedback signal -
#12	Feedback signal +



Auxiliary switch



WARNING! Leakage current is possible (<3.5mA)!
Connect the earth first before applying any supply voltage!
Disconnect the supply voltage before the earth!

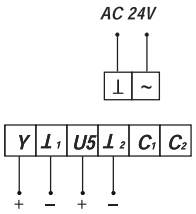
Notes:
- Caution: Power supply voltage!
- Power supply Com/Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.

SY..U24-MF-T

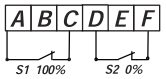
Modulating control

Terminal

⊥	Power supply Com/Neutral
~	Power supply Hot line
Y	Control signal +
⊥1	Control signal -
U5	Feedback signal +
⊥2	Feedback signal -
C1	leave unconnected
C2	



Auxiliary switch



SY(2...4)U24-MF-T

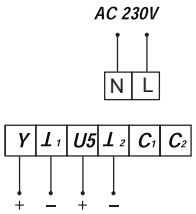
Notes:
- Connection via safety isolating transformer.
- Power supply Com/Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.

SY..U230-MF-T

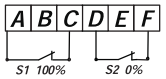
Modulating control

Terminal

⊥	Power supply Com/Neutral
~	Power supply Hot line
Y	Control signal +
⊥1	Control signal -
U5	Feedback signal +
⊥2	Feedback signal -
C1	leave unconnected
C2	



Auxiliary switch



SY(2...12)U230-MF-T

WARNING! Leakage current is possible (<3.5mA)!
Connect the earth first before applying any supply voltage!
Disconnect the supply voltage before the earth!

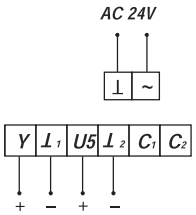
Notes:
- Caution: Power supply voltage!
- Power supply Com/Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.

SY..U24-MP-T

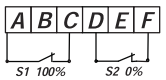
Modulating control

Terminal

⊥	Power supply Com/Neutral
~	Power supply Hot line
Y	Sensor signal +
⊥1	Sensor signal -
U5	MP-Bus signal +
⊥2	MP-Bus signal -
C1	leave unconnected
C2	



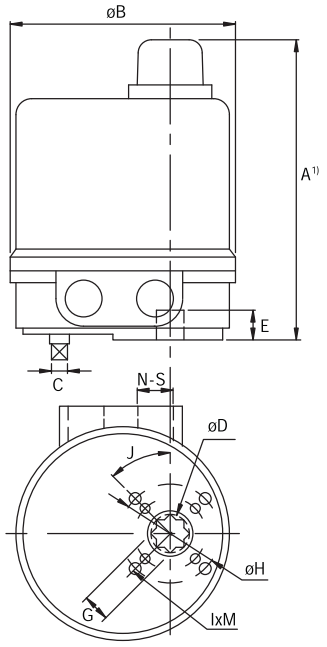
Auxiliary switch



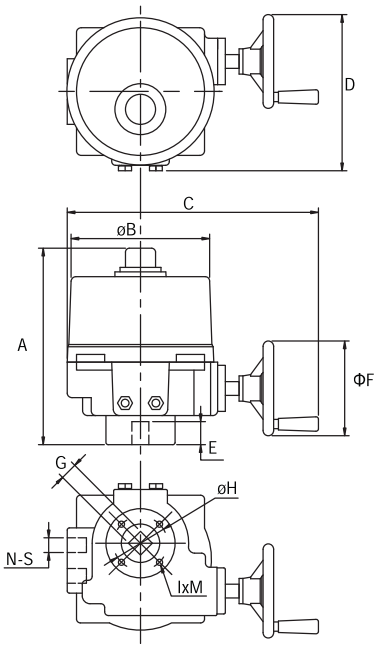
SY(2...4)U24-MP-T

Notes:
- Connection via safety isolating transformer.
- Power supply Com/Neutral and control signal "-" wiring to a common is prohibited.
- The control signal has to be separated from the others and shielded.
- 75% duty cycle.

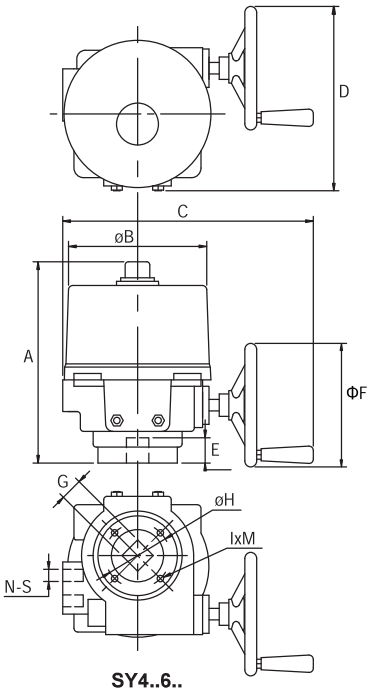
Dimensions [mm]



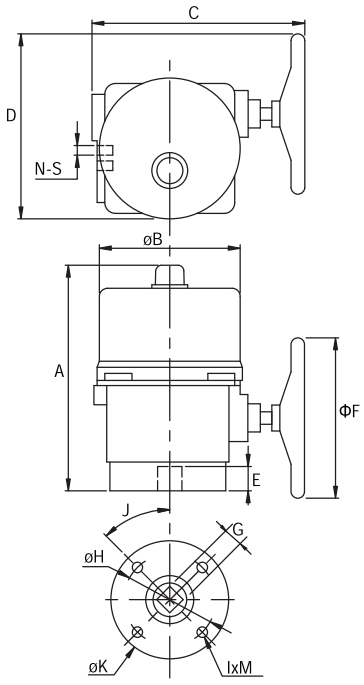
SY1..



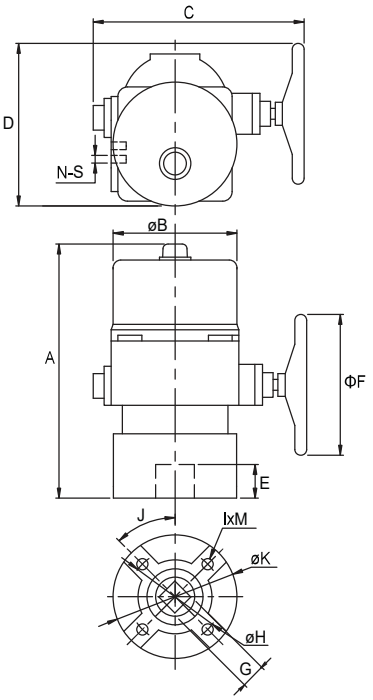
SY2/3..



SY4..6..



SY7/8..



SY9..12..

1) For SY1U24(230)-SR-T, A is 183.
2) For SY2(3)-230-3-T, A is 255.

Dim / Model No	A	B	C	D	E	Φ F	G	H	I	J	K	M	N	S	Flange type
SY1..	150 [1)]	106	8	19	15	-	14	50	4	45°	-	M6	2	1/2 PS	F05
SY2/3..	255 [2)]	181	326	208	30	123	17/22	70	4	-	90	M8	2	1/2 PS	F07
SY4..6..	317	217	394	294	40	194	22/35	102	4	-	125	M10	2	1/2 PS	F10
SY7/8..	406	217	347	336	45	295	36	140	4	45°	180	M16	2	1/2 PS	F14
SY9...12..	564	256	455	392	57	395	36	165	4	45°	221	M20	2	1/2 PS	F16

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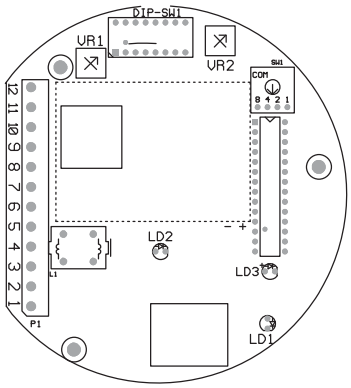
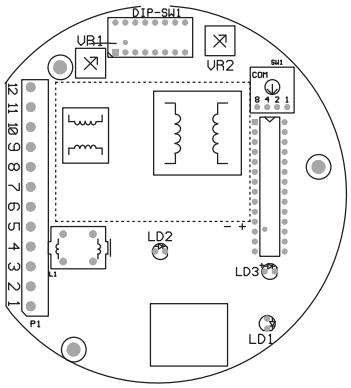
Circuit board set up



SY1U24-SR-T



SY1U230-SR-T

Disconnect power supply before changing the following settings.

The words in bold are default settings.

•DIP switches setting
Factory setting

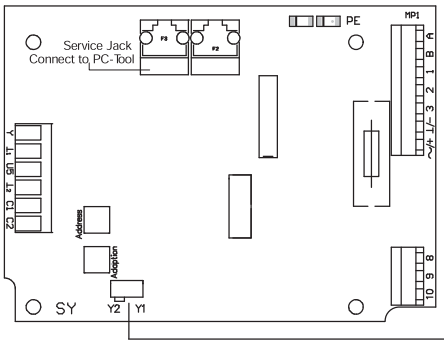
S1, S2 - for Input signal			S3, S4, S5 - for Output signal				S6 - Direction of Travel in response to the control		S7 and S8 - Actuator response to the control signal failure		
Input signal	**S1**	**S2**	**Output signal**	**S3**	**S4**	**S5**	**Symbol**	**S6**	**When signal fails**	**S7**	**S8**
(0)2...10V	**Off**	**On**	**(0)2...10V**	**On**	**Off**	**On**	90° Y	Off	Fully closed	Off	On
4...20mA	On	Off	4...20mA	Off	On	Off			Fully open	On	Off
1...5V	Off	Off					90° Y	On	**Stop**	**On**	**On**

•SW1 sensitive switch
Position "0": Lowest sensitive, 0...90° divided into 17 steps.
Position "1": Highest sensitive, 0...90° divided into 80 steps.
Prior to switch-on, make sure the input signal and voltage wiring are in accordance with the actuator name plate and Dip-switch setting.

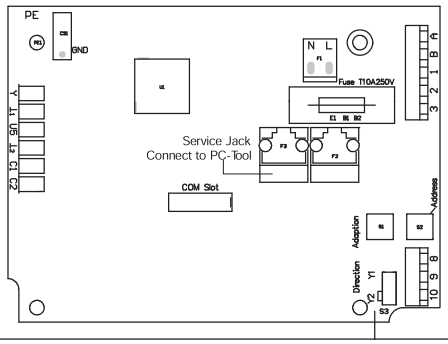
(Only available for SY1U24/230-SR-T)
When you need to adjust the signal of modulating board, please adjust the VR1 and VR2:
- VR2 adjusts 4mA, 2V, 1V (Fully-closed)
- VR1 adjusts 20mA, 10V, 5V (Fully-open)

Please turn the VR2 to the end by clockwise direction and input 4mA to modulating board. Then please slightly turn the VR2 by counter-clockwise direction about 3...6 times until the RED light keeps ON.

Please turn the VR1 to the end by counter clockwise direction and input 20mA to modulating board. Then please slightly turn the VR1 by clockwise direction about 3...6 times until the GREEN light keeps ON.



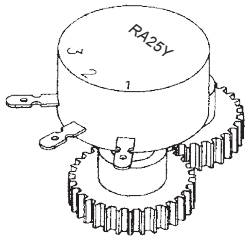
SY(2...4)U24-MF/MP-T



SY(2...12)U230-MF-T

Direction switch
Y2 standard
Factory setting

Position feedback potentiometer



Potentiometer

For modulating actuators, the potentiometer is a standard part.

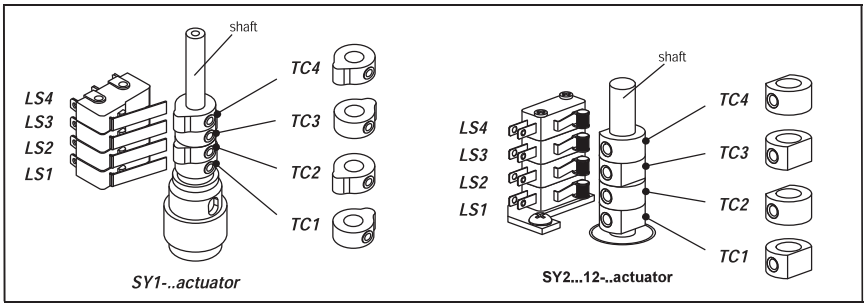
Potentiometer points 1, 2, 3 are wired to terminal blocks 10, 9, 8.

When the actuator is closed:	8, 9	5kΩ
	9, 10	0kΩ
When the actuator is open:	8, 9	0kΩ
	9, 10	5kΩ

Travel cams TC..

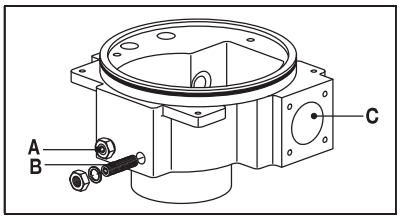
Only authorised and trained persons are allowed to change the settings.

- TC1-for open position of limit switch (factory setting 90°).
- TC2-for closed position of limit switch (factory setting 0°).
- TC3-for open position of auxiliary switch (factory setting 87°).
- TC4-for closed position of auxiliary switch (factory setting 3°).



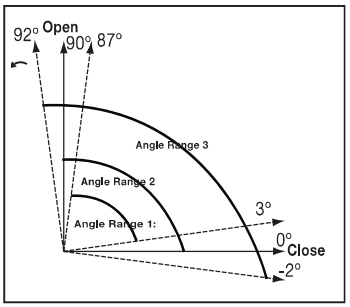
The cams for adjusting the limit and auxiliary switches are accessible if the cover is removed. The LS2/LS1 limit switches interrupt the power supply to the motor and are controlled by means of the TC.. cams which rotate with the shaft. The LS4/LS3 auxiliary switches can optionally be connected for signalisation purposes. The actuator closes the valve when the shaft turns clockwise (CW) and opens the valve when the shaft turns counter clockwise (CCW).

Relationship of auxiliary switches, limiting switches and limits of manual rotation angle



- A stop screw for OPEN limiting
- B stop screw for CLOSED limiting
- C stop screw connection for manual operation

The limits of manual operation is set at -2°...92° in the factory. The override handwheel turns the planetary gear by means of a worm wheel. The gear is stopped mechanically by the two stop screws A and B.



Angle Range 1: Two auxiliary switches LS3 and LS4 are set at 3°...87° angle in the factory

Angle Range 2: The two limit switches LS2 and LS1 are set at 0°...90° angle in the factory

Angle Range 3: Two stop screws A and B are set at -2°...92° angle in the factory

Fully Open/Closed position setting

Fully Closed position (0%) setting

1) Power on. The actuator will drive CW to closed position.
2) Check whether disc of valve at fully closed position.
3) Adjust travel cams TC2 and stop screws for closed limiting (see “Adjusting travel cams and stop screws”)

Fully Open position (100%) setting

1) Power on. The actuator will drive CCW to open position.
2) Check whether disc of valve is at fully open position.
3) Adjust travel cams TC1 and stop screws for open limiting (see “Adjusting travel cams and stop screws”)

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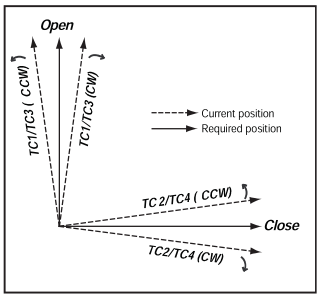
Adjusting the TC and stop screws

1. Loosen the corresponding stop screw;
2. Loosen the travel cam to be re-adjusted with a 2.5mm hexagonal key;
3. Turn the travel cam clockwise or counter clockwise with the hexagonal key as shown in the right diagram and initially tighten the cam;
4. Check the full rotation of limit switch with power on;
5. Tighten the travel cam after successful re-adjustment, otherwise repeat to do point 3 and 4 until the travel cam is successfully re-adjusted.
6. When the motor stops at fully closed or open position, tighten the corresponding stop screw until it touches the gearbox, turn the stop screw cycle back and lock by a hexagonal key and a wrench (1 turn of the stop screw corresponding to 2° angle of rotation around).

- **The LS2/LS1 switches must always switch off the motor before the effect of stop screws.**
- **Perform an adaption after changing the position of the travel cam**



Adaption button

Installation guidelines

Cautions of installation

- Check power supply before wiring.
- Replace housing cover immediately after making adjustments and make sure seal is secure. If water or dust is present, thoroughly dry and clean before replacing housing.
- The motor cannot be reversed and the actuator cannot be installed upside down.
- Be sure to keep it away from gas; do not use in explosive and chemical district.
- Power off before maintenance purpose.
- The Open/Close frequency of the electric actuator is restricted according to the duty cycle to avoid overheating.

Maintenance

All actuators are lubricated with anti-high temperature lubricant for a long life and therefore require no special maintenance. The condition of the valve stem and its nut must be checked periodically to make sure they are clean and well lubricated. We recommend that a program of periodic maintenance should be drawn up for actuators that are operated infrequently.

Storage

The actuator includes electrical equipment as well as grease lubricated gear stages. In spite of the weather proof enclosure, oxidation, jamming and other alterations are possible if the actuator is not correctly stored. The actuator should be stored under a shelter in a clean, dry place and protected from frequent changes in temperature. Avoid placing the actuators directly on the floor. The actuators are equipped with heat resistance, but it's recommended to connect the actuators to the power supply, especially if storage area is humid. Check that the temporary sealing plug of the cable entries are well in place. Make sure that the covers and boxes are well closed to ensure weather proof sealing.

FAQ

Conditions	Possibilities	Solutions
Motor overheat	Voltage abnormal	Check by multimeter
	High working frequency	Limit the working frequency
	Motor spindle is stuck or valve is too tight to move	Replace the stuck assemblies or the valve.
	The gear box stuck by stop screw	Check and correct travel cam for evidence of loosening; inspect the stop screw setting by operating the handwheel manually.
No operation	Power supply or voltage abnormal	Check the power supply voltage with the identification plate.
	Fuse blown	Check and replace the fuse as required (except for HW-CBPCB)
	Tripping of motor thermal protective device	Check if the motor is hot.The actuator will be available again after the motor has cooled down. Solve the motor overheat problem.
Running motor stops	Power supply has short circuit	Check wiring
	External object stuck in the pipe	Take off the valve for cleaning
Not fully opening/closing	The fixing screw for travel cam is loose	Re-adjust and tighten the travel cam
The actuator is continually hunting	The sensitivity setting is incorrect	Adjust the sensitivity switch SW1 to increase the number (only for SY1..).
Occasional fail in motor switched on or off	Power input of "open" and "close" simultaneously	Check if the external control switch is normal; relays are needed in parallel connection of several actuators

GR230A-5 Rotary actuator for rotary valves
GR230A-7 Rotary actuator for rotary valves

- **Nominal torque 40Nm**
- **Nominal voltage AC 230V**
- **Control Open-close**

Technical data

Electrical data	Nominal voltage		AC 230V
	Nominal voltage frequency		50/60Hz
	Nominal voltage range		AC 85...265V
	Power consumption in operation		5W
	Power consumption at rest		2W
	Power consumption for wire sizing		9VA
	Connection supply / control		Cable 1m, 3 x 0.75mm²
	Parallel operation		Yes (note the performance data)
Functional data	Torque motor	GR230A-5 GR230A-7	min. 40Nm min. 40Nm
	Manual override		Gear disengagement with push-button, can be locked
	Running time motor		150s / 90°
	Sound power level motor max.		45dB(A)
	Position indication		Mechanical, pluggable
Safety	Protection class IEC/EN		II protective insulated
	Protection class UL		II protective insulated
	Degree of protection IEC/EN		IP54
	Degree of protection NEMA/UL		NEMA 2, UL Enclosure Type 2
	Electromagnetic compatibility		CE according to 2004/108/EC
	Low-voltage directive		CE according to 2006/95/EC
	Certification IEC/EN		Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
	Mode of operation		Type 1
	Rated current voltage motor		4kV
	Control pollution degree		3
	Ambient temperature		-30...50°C
	Non-operating temperature		-40...80°C
	Ambient humidity		95% r.h., non-condensing
	Maintenance		Maintenance-free
Mechanical data	Connection flange	GR230A-5 GR230A-7	F05 F07
Weight	Weight		Approx. 1.85kg

Safety notes

- This device has been designed for use in stationary heating, ventilation and air conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The switch for changing the direction of rotation may only be operated by authorised specialists. The direction of rotation must not in particular be reversed in a frost protection circuit.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- The cables must not be removed from the device.
- The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

UL marked actuators is optional, please contact your local Sales Representative for details.

Product features

Manual override
Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).

High functional reliability
The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.

Simple direct mounting
Simple direct mounting on the rotary valve with mounting flange. The mounting position in relation to the fitting can be selected in 90° steps.

Combination valve/actuator
For valves with the following mechanical specifications in accordance with ISO 5211 F05:
- Square stem head SW = 14mm for form-fit coupling of the rotary actuator.
- Hole circle d = 50mm

For valves with the following mechanical specifications in accordance with ISO 5211 F07:
- Square stem head SW = 17mm for form-fit coupling of the rotary actuator.
- Hole circle d = 70mm

Accessories

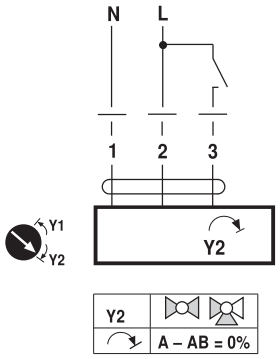
Electrical accessories

Description	Type
Auxiliary switch, add-on, 1 x SPDT	S1A
Auxiliary switch, add-on, 2 x SPDT	S2A
Feedback potentiometer 140 Ohm, add-on	P140A
Feedback potentiometer 200 Ohm, add-on	P200A
Feedback potentiometer 500 Ohm, add-on	P500A
Feedback potentiometer 1 kOhm, add-on	P1000A
Feedback potentiometer 2.8 kOhm, add-on	P2800A
Feedback potentiometer 5 kOhm, add-on	P5000A
Feedback potentiometer 10 kOhm, add-on	P10000A

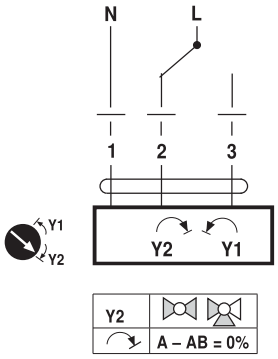
Wiring diagram

Notes
- Caution: Power supply voltage!
- Parallel connection of other actuators possible. Observe the performance data.
- Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.

GR230A-5
AC 230V, open-close



Cable colours:
1 = blue
2 = brown
3 = white



UL marked actuators is optional, please contact your local Sales Representative for details.

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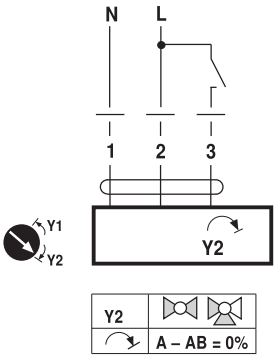
Wiring diagram

Notes

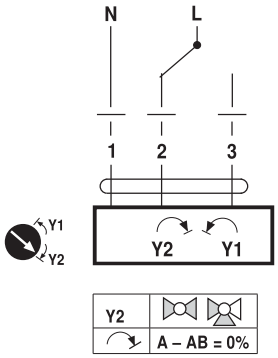
- Caution: Power supply voltage!
- Parallel connection of other actuators possible. Observe the performance data.
- Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.

GR230A-7

AC 230V, open-close

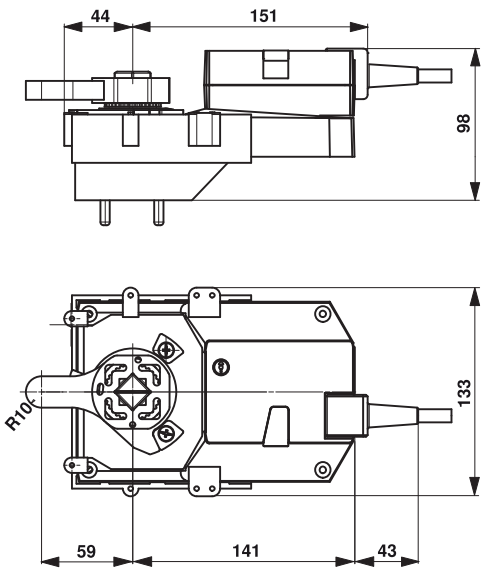


Cable colours:
1 = blue
2 = brown
3 = white

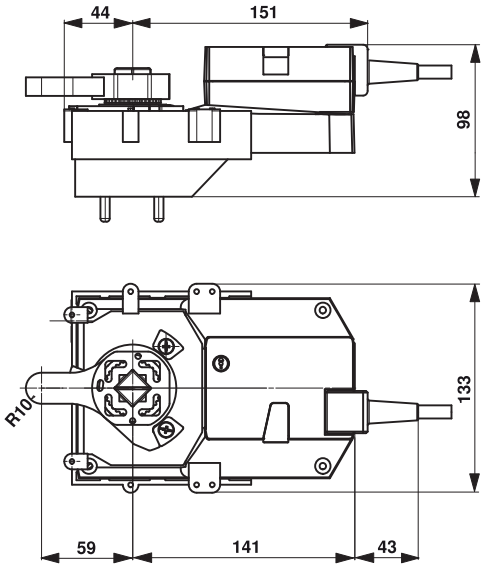


Dimensions [mm]

GR230A-5



GR230A-7



UL marked actuators is optional, please contact your local Sales Representative for details.

SR230A-5

Rotary actuator for rotary valves
- **Nominal torque 20Nm**
- **Nominal voltage AC 230V**
- **Control Open-close, 3-point**

Technical data

Electrical data	Nominal voltage	AC 230V
	Nominal voltage frequency	50/60Hz
	Nominal voltage range	AC 85...265V
	Power consumption in operation	3W
	Power consumption in rest position	0.6W
	Power consumption for wire sizing	7VA
	Connection supply / control	Cable 1m, 3 x 0.75mm²
	Parallel operation	Yes (note the performance data)
Functional data	Torque motor	Min. 20Nm
	Manual override	Gear disengagement with push-button, can be locked
	Running time motor	90s / 90°
	Sound power level motor max.	45dB(A)
	Position indication	Mechanically, integrated, two-section
Safety	Protection class IEC/EN	II Protective insulated
	Protection class UL	II Protective insulated
	Degree of protection IEC/EN	IP54
	Degree of protection NEMA/UL	NEMA 2, UL Enclosure Type 2
	EMC	CE according to 2004/108/EC
	Low voltage directive	CE according to 2006/95/EC
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Mode of operation	Type 1
	Rated impulse voltage supply / control	4kV
	Control pollution degree	3
	Ambient temperature	-30...50°C
	Non-operating temperature	-40...80°C
	Ambient humidity	95% r.h., non-condensing
	Maintenance	Maintenance-free
Mechanical data	Connection flange	F05
Weight	Weight	Approx. 1kg

Safety notes

- This device has been designed for use in stationary heating, ventilation and air conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Caution: Power supply voltage!
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The switch for changing the direction of rotation may only be operated by authorised specialists. The direction of rotation must not in particular be reversed in a frost protection circuit.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- The cables must not be removed from the device.
- The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

UL marked actuators is optional, please contact your local Sales Representative for details.

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Product features

Simple direct mounting — Simple direct mounting on the rotary valve with mounting flange. The mounting position in relation to the fitting can be selected in 90° steps.

Manual override — Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).

High functional reliability — The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.

Adjustable angle of rotation — Adjustable angle of rotation with mechanical end stops.

Combination valve/actuator — For valves with the following mechanical specifications in accordance with ISO 5211 F05:
- Square stem head SW = 14mm for form fit coupling of the rotary actuator.
- Hole circle d = 50mm

Accessories

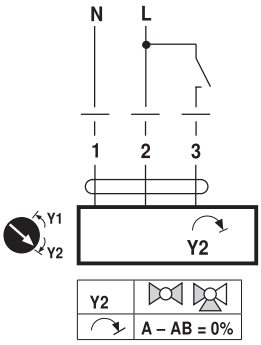
	Description	Type
Electrical accessories	Auxiliary switch, add-on, 1 x SPDT	S1A
	Auxiliary switch, add-on, 2 x SPDT	S2A
	Feedback potentiometer 140 Ohm, add-on	P140A
	Feedback potentiometer 200 Ohm, add-on	P200A
	Feedback potentiometer 500 Ohm, add-on	P500A
	Feedback potentiometer 1 kOhm, add-on	P1000A
	Feedback potentiometer 2.8 kOhm, add-on	P2800A
	Feedback potentiometer 5 kOhm, add-on	P5000A
	Feedback potentiometer 10 kOhm, add-on	P10000A

Electrical installation

Notes
- Caution: Power supply voltage!
- Parallel connection of other actuators possible. Observe the performance data.
- Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.

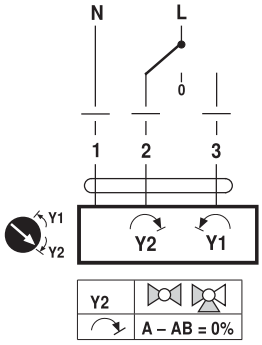
Wiring diagrams

AC 230V, open-close



Cable colours:
1 = blue
2 = brown
3 = white

AC 230V, 3-point

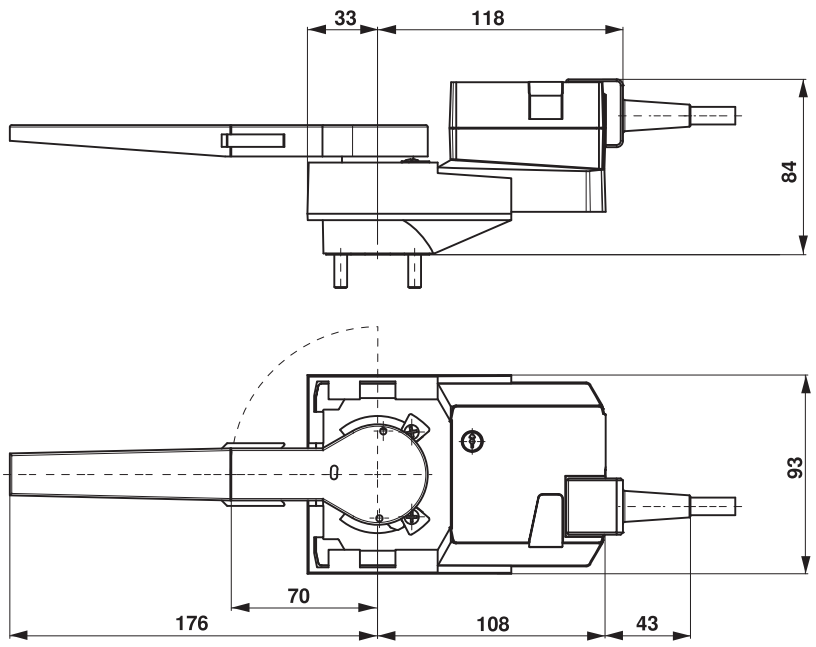


Cable colours:
1 = blue
2 = brown
3 = white

UL marked actuators is optional, please contact your local Sales Representative for details.

Dimensions [mm]

Dimensional drawings



UL marked actuators is optional, please contact your local Sales Representative for details.

V7.1 02.2015•Subject to modification

DR..A(-SR)-7 Rotary Actuator

DR24A(-SR)-7 Rotary actuator for butterfly valves
- **Nominal torque 90Nm**
- **Nominal voltage AC/DC 24V**
- **Open-close Control: DR24A-7**
- **Modulating Control: DR24A-SR-7**

DR230A-7 Rotary actuator for butterfly valves
- **Nominal torque 90Nm**
- **Nominal voltage AC 100...240V**
- **Control Open-close**

Technical data

Basc technical data	Nominal voltage frequency	50/60Hz
	Parallel operation	No
	Torque motor	Max. 90Nm (not constant)
	Manual override	Gear disengagement with push-button, can be locked
	Running time motor	150s / 90°
	Sound power level motor max.	45dB(A)
	Position indication	Yes
	Degree of protection IEC/EN	IP54
	EMC	CE according to 2004/108/EC
	Certification IEC/EN	Certified to IEC/EN 60730-1 and IEC/EN 60730-2-14
	Mode of operation	Type 1
	Control pollution degree	3
	Ambient temperature	-30...50°C
	Non-operating temperature	-40...80°C
	Ambient humidity	95% r.h., non-condensing
	Maintenance	Maintenance-free
	Connection flange	F07
	Weight	Approx. 3.6kg
DR24A-7	Nominal voltage	AC/DC 24V
	Nominal voltage range	AC 19.2...28.8 V / DC 21.6...28.8 V
	Power consumption in operation	4.5W
	Power consumption at rest	2W
	Power consumption for wire sizing	7VA
	Connection	Cable 1m, 3 x 0.75mm²
	Protection class IEC/EN	III Safety extra-low voltage
	Rated current voltage	0.8kV
DR24A-SR-7	Nominal voltage	AC/DC 24V
	Nominal voltage range	AC 19.2...28.8V / DC 21.6...28.8V
	Power consumption in operation	7W
	Power consumption at rest	2W
	Power consumption for wire sizing	9VA
	Connection	Cable 1m, 4 x 0.75mm²
	Protection class IEC/EN	III Safety extra-low voltage
	Rated current voltage	0.8kV
DR230A-7	Nominal voltage	AC 100...240V
	Nominal voltage range	AC 85...265V
	Power consumption in operation	5W
	Power consumption at rest	2W
	Power consumption for wire sizing	9VA
	Connection	Cable 1m, 3 x 0.75mm²
	Protection class IEC/EN	II totally insulated
	Rated current voltage	4kV

UL marked actuators is optional, please contact your local Sales Representative for details.

V7.1 02.2015•Subject to modification

Safety notes

- This actuator has been designed for use in stationary heating, ventilation and air-conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The switch for changing the direction of rotation may not be adjusted.
- The angle of rotation is not permitted to be subjected to mechanical limitation. It is forbidden to alter the mechanical end stops.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- The cables must not be removed from the device.
- For DR24A-7, the device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- For DR230A-7, caution: power supply voltage!

Product features

High functional reliability The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.

Direct mounting Simple direct mounting on the butterfly valves with ISO 5211-F07 mounting flange. The mounting orientation with reference to the butterfly valve can be selected in 90° (angle) steps.

Manual override For DR24A-7, Manual operation is possible with the push-button (the gearing latch remains disengaged as long as the push-button is pressed or detented).
For DR24A-SR-7, manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).
For DR230A-7, manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).

Mode of operation For DR24A-SR-7, the actuator is connected with a standard modulating signal of DC 0 ... 10V and travels to the position defined by the positioning signal. The measuring voltage U serves for the electrical display of the actuator position 0 ... 100% and as slave control signal for other actuators.

Accessories

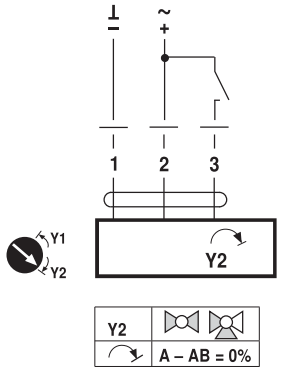
Electrical accessories

Description	Type
Auxiliary switch, add-on, 1 x SPDT	S1A
Auxiliary switch, add-on, 2 x SPDT	S2A
Feedback potentiometer 140 Ohm, add-on	P140A
Feedback potentiometer 200 Ohm, add-on	P200A
Feedback potentiometer 500 Ohm, add-on	P500A
Feedback potentiometer 1 kOhm, add-on	P1000A
Feedback potentiometer 2.8 kOhm, add-on	P2800A
Feedback potentiometer 5 kOhm, add-on	P5000A
Feedback potentiometer 10 kOhm, add-on	P10000A

Wiring diagram

Notes
- Connection via safety isolating transformer.
- Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.

DR24A-7
AC/DC 24V, open-close



Cable colours:
1 = black
2 = red
3 = white

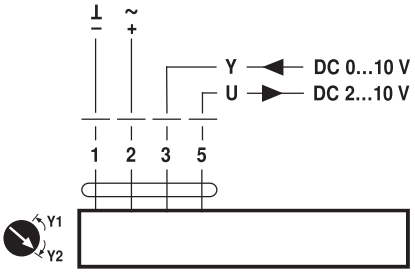
UL marked actuators is optional, please contact your local Sales Representative for details.

Wiring diagram

Notes
- Connection via safety isolating transformer.
- Direction of rotation switch is covered. Factory setting: Direction of rotation Y2.

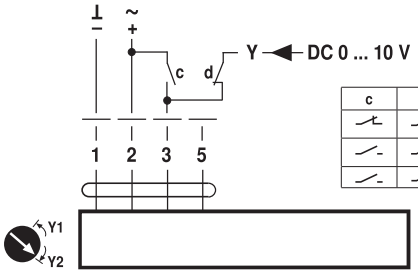
DR24A-SR-7

AC/DC 24V, modulating



Cable colours:
1 = black
2 = red
3 = white
5 = orange

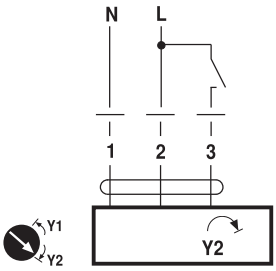
AC/DC 24V, modulating, override control



c	d	Y1 / Y2	
⌐	⌐-	Y1	A – AB = 100%
⌐-	⌐-	Y2	A – AB = 0%
⌐-	⌐	DC 0...10 V	

DR230A-7

AC 230V, open-close



Y2	
	A – AB = 0%

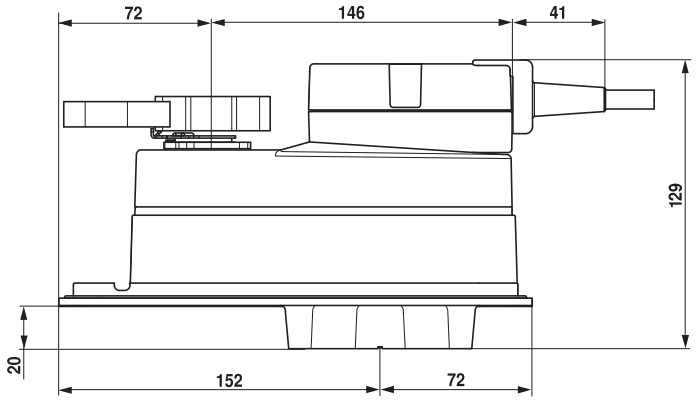
Cable colours:
1 = blue
2 = brown
3 = white

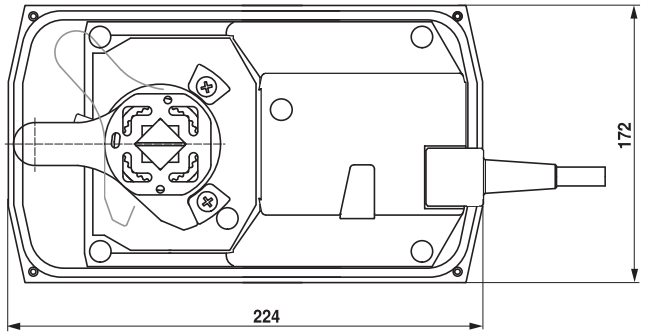
Dimensions [mm]

DR24A-7

DR24A-SR-7

DR230A-7





UL marked actuators is optional, please contact your local Sales Representative for details.

V7.1 02.2015•Subject to modification

BELIMO

Technical data sheet D6..N

Butterfly valve with Wafer types
- **For open and closed cold and warm water systems**
- **For switching heat generators or cooling machines on and off**

Type overview

Type	DN [ ]	PN [ ]	kvmax [m³/h]
D625N	25	6 / 10 / 16	45
D632N	32	6 / 10 / 16	55
D640N	40	6 / 10 / 16	70
D650N	50	6 / 10 / 16	90
D665N	65	6 / 10 / 16	180
D680N	80	6 / 10 / 16	300
D6100N	100	6 / 10 / 16	580
D6125N	125	6 / 10 / 16	820
D6150N	150	6 / 10 / 16	1600
D6350N	350	10 / 16	10900
D6400N	400	16	14200
D6450N	450	16	18800
D6500N	500	16	24100
D6600N	600	16	37300
D6700N	700	16	42800

The types D6200N, D6250N and D6300N have been replaced by the types D6200W, D6250W and D6300W. For technical data please check the datasheet D6..W.

Technical data

Functional data	Media	Cold and warm water, water with glycol up to max. 50% vol.
	Medium temperature	-20...120°C
	Permissible pressure ps	1600 kPa
	Leakage rate	Leakage rate A, tight (EN 12266-1)
	Pipe connector	Flange PN 6/10/16 (according to ISO 7005-2) (DN 25...150) Flange PN 10/16 (according to ISO 7005-2) (DN 350) Flange PN 16 (according to ISO 7005-2) (DN 400...700)
	Angle of rotation	90°
	Installation position	Upright to horizontal (in relation to the stem)
	Suitable connection flange	In accordance with ISO 7005-2 and EN 1092-2
	Maintenance	Maintenance-free
Materials	Housing	EN-JS1030 (GGG 40), epoxy-powder coating
	Closing element	1.4301 (stainless steel)
	Stem	1.4005 (stainless steel)
	Stem seal	O-ring EPDM
	Stem bearing	RPTFE
	Seat	EPDM

Safety notes

- The valve has been designed for use in stationary heating, ventilation and air-conditioning systems and must not be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.

Safety notes

- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The valve does not contain any parts that can be replaced or repaired by the user.
- The valve may not be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- When determining the flow rate characteristic of controlled devices, the recognised directives must be observed.
- The damper must be opened and closed slowly in order to avoid hydraulic shocks in the pipe system.

Product features

Mode of operation

The butterfly valve is opened or closed completely by an open-close rotary actuator. Continuous rotary actuators are connected by a commercially available controller and move the valve to any position desired. The valve disk made of stainless steel is pressed into the soft-sealing EPDM seat by a rotary movement and ensures leakage rate A (tight). The pressure losses are slight in the open position and the kv value is at a maximum.

Manual override

Manual throttling or shut-off can be carried out with a lever or a worm gear (see «Accessories»).
-With lever (DN25…150): Adjustable in 10 ratchet steps with position indication (0 = 0° (angle); 9 = 90° (angle))
-With worm gear (DN25...700): steplessly adjustable (self-locking) with position indication.

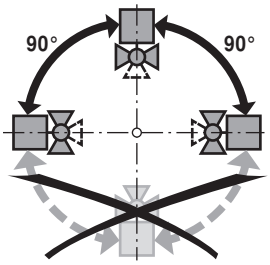
Accessories

	Description	Type
Electrical accessories	Stem heating flange ISO 5211, F05 (30W)	ZR24-F05
	Description	**Type**
Mechanical accessories	Worm gear for D6.. butterfly valves, DN600	ZD6N-S100
	Manual control for D6.. butterfly valves, for DN25...DN100	ZD6N-H100
	Worm gear for butterfly valves DN125...300	ZD6N-S150
	Manual control for D6.. butterfly valves, for DN125...DN150	ZD6N-H150
	Worm gear for D6.. butterfly valves, DN300...350	ZD6N-S350
	Worm gear for D6.. butterfly valves, DN400	ZD6N-S400
	Worm gear for D6.. butterfly valves, DN450	ZD6N-S450
	Worm gear for D6.. butterfly valves, DN500	ZD6N-S500
	Worm gear for D6.. butterfly valves, DN600	ZD6N-S600
	Worm gear for D6.. butterfly valves, DN700	ZD6N-S700

Installation notes

Recommended installation positions

The butterfly valves may be mounted upright to horizontal. The butterfly valves may not be installed in a hanging position i.e. with the spindle pointing downwards.



Water quality requirements

The water quality requirements specified in VDI 2035 must be adhered to.

Installation notes

Stem heating

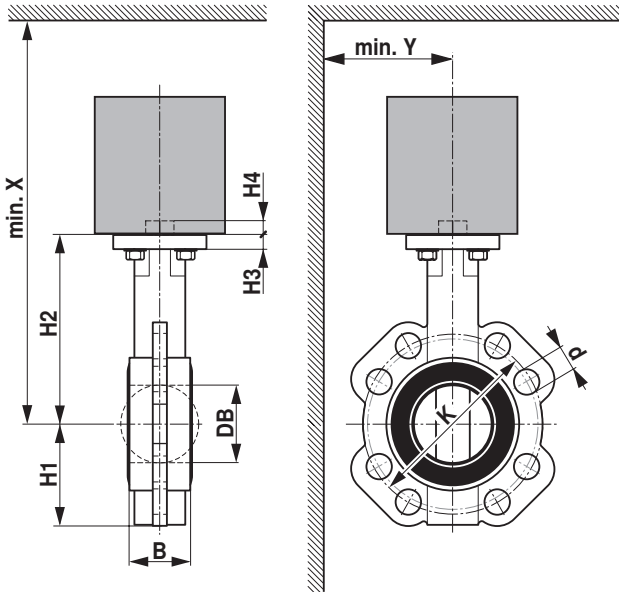
In cold water applications and warm humid ambient air can cause condensation in the actuators. This can lead to corrosion in the gear box of the actuator and causes a breakdown of it. In such applications, the use of a stem heating is provided.
The stem heating must be enabled only when the system is in operation, because it does not have temperature control.

Maintenance

Butterfly valves and rotary actuators are maintenance-free.
Before any service work on the final controlling device is carried out, it is essential to isolate the rotary actuator from the power supply (by unplugging the electrical cable if necessary). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow all components to cool down first if necessary and allways reduce the system pressure to ambient pressure level).
The system must not be returned to service until the butterfly valve and the rotary actuator have been reassembled correctly in accordance with the instructions and the pipeline has been refilled by professionally trained personnel.
To avoid a torque increase during off season shut down, exercise the butterfly valve (full open and close) at least once a month.

Dimensions / Weight

Dimensional drawings



Type	DN [ ]	B [mm]	DB [mm]	H1 [mm]	H2 [mm]	H3 [mm]	H4 [mm]	d (PN6)	K (PN6) [mm]
D625N	25	32	30	57	86	10	13	4 x 11	75
D632N	32	33	35	60	100	10	13	4 x 14	90
D640N	40	33	42	68	119	10	13	4 x 14	100
D650N	50	43	52	72	133	11	13	4 x 14	110
D665N	65	46	64	81	147	11	13	4 x 14	130
D680N	80	46	78	96	158	11	13	4 x 19	150
D6100N	100	52	103	106	170	11	13	4 x 19	170
D6125N	125	56	122	122	194	15	19	8 x 19	200
D6150N	150	56	155	140	202	15	19	8 x 19	225
D6350N	350	78	333	267	361	15	24		
D6400N	400	102	391	308	400	20	48		
D6450N	450	114	442	337	422	22	48		
D6500N	500	127	493	359	480	22	48		
D6600N	600	154	594	454	562	25	48		
D6700N	700	165	695	505	624	33	66		

Dimensions / Weight

Type	d (PN10)	K (PN10) [mm]	d (PN16)	K (PN16) [mm]	X [mm]	Y [mm]	Weight [kg]
D625N	4 x 14	85	4 x 14	85	320	150	1.1
D632N	4 x 19	100	4 x 19	100	340	150	1.5
D640N	4 x 19	110	4 x 19	110	350	160	1.6
D650N	4 x 19	125	4 x 19	125	370	160	2.4
D665N	4 x 19	145	4 x 19	145	380	170	3.0
D680N	8 x 19	160	8 x 19	160	390	180	3.3
D6100N	8 x 19	180	8 x 19	180	410	190	4.0
D6125N	8 x 19	210	8 x 19	210	530	210	6.7
D6150N	8 x 23	240	8 x 23	240	540	220	7.4
D6350N	16 x 23	460	16 x 28	470	730	340	34
D6400N			4 x 31	525	1300	1300	60
D6450N			4 x 31	585	1300	1400	73
D6500N			4 x 33	650	1700	1500	98
D6600N			16 x 37	770	1800	1800	190
D6700N			20 x 37	840	1800	1900	330

Further documentation

- Overview Valve-actuator combinations
- Data sheets for actuators
- Installation instructions for actuators and/or butterfly valves
- General notes for project planning

BELIMO

Technical data sheet D6..W

Butterfly valve with Wafer types
- **For open and closed cold and warm water systems**
- **For switching heat generators or cooling machines on and off**

Type overview

Type	DN [ ]	PN [ ]	kvmax [m³/h]
D6200W	200	6 / 10 / 16	2900
D6250W	250	6 / 10 / 16	4400
D6300W	300	6 / 10 / 16	7300

Technical data

Functional data	Media	Cold and warm water, water with glycol up to max. 50% vol.
	Medium temperature	-20...120°C
	Permissible pressure ps	1600 kPa
	Leakage rate	Leakage rate A, tight (EN 12266-1)
	Pipe connector	Flange PN 6/10/16 (according to ISO 7005-2)
	Angle of rotation	90°
	Installation position	Upright to horizontal (in relation to the stem)
	Suitable connection flange	In accordance with ISO 7005-1 and EN 1092-1 In accordance with ISO 7005-2 and EN 1092-2 In accordance with DIN 2641 and DIN 2642
	Maintenance	Maintenance-free
Materials	Housing	EN-GJS400-15 (GGG 40), polyester-powder coating
	Closing element	1.4308 (stainless steel)
	Stem	1.4021 (stainless steel)
	Stem seal	O-ring EPDM
	Stem bearing	Bronze, steel, PTFE
	Seat	EPDM

Safety notes

- The valve has been designed for use in stationary heating, ventilation and air-conditioning systems and must not be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The valve does not contain any parts that can be replaced or repaired by the user.
- The valve may not be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- When determining the flow rate characteristic of controlled devices, the recognised directives must be observed.
- The damper must be opened and closed slowly in order to avoid hydraulic shocks in the pipe system.
- The valve is not allowed to be operated without actuator or worm gear while flow is in the pipe. Without actuator or worm gear, the valve could close and cause damage (water hammer).

Product features

Mode of operation

The butterfly valve is opened or closed completely by an open-close rotary actuator. Continuous rotary actuators are connected by a commercially available controller and move the valve to any position desired. The valve disk made of stainless steel is pressed into the soft-sealing EPDM seat by a rotary movement and ensures leakage rate A (tight). The pressure losses are slight in the open position and the kv value is at a maximum.

Manual override

Manual throttling or shut-off can be carried out with a worm gear (see «Accessories»). The worm gear with position indication is steplessly adjustable (self-locking).

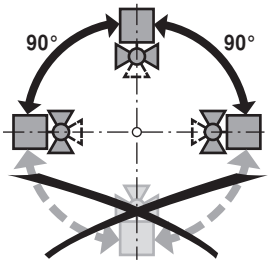
Accessories

	Description	Type
Mechanical accessories	Worm gear for butterfly valves DN125...300	ZD6N-S150

Installation notes

Recommended installation positions

The butterfly valves may be mounted upright to horizontal. The butterfly valves may not be installed in a hanging position i.e. with the spindle pointing downwards.



Water quality requirements

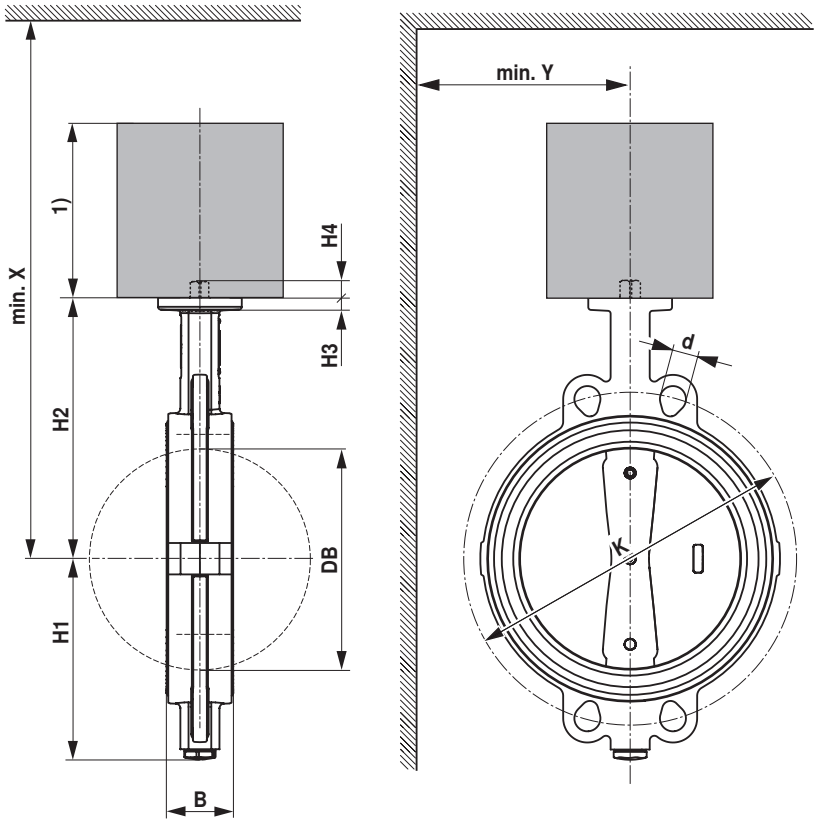
The water quality requirements specified in VDI 2035 must be adhered to.

Maintenance

Butterfly valves and rotary actuators are maintenance-free.
Before any service work on the final controlling device is carried out, it is essential to isolate the rotary actuator from the power supply (by unplugging the electrical cable if necessary). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow all components to cool down first if necessary and allways reduce the system pressure to ambient pressure level).
The system must not be returned to service until the butterfly valve and the rotary actuator have been reassembled correctly in accordance with the instructions and the pipeline has been refilled by professionally trained personnel.
To avoid a torque increase during off season shut down, exercise the butterfly valve (full open and close) at least once a month.

Dimensions / Weight

Dimensional drawings



The actuator dimensions can be found on the respective actuator data sheet.

Type	DN [ ]	B [mm]	DB [mm]	H1 [mm]	H2 [mm]	H3 [mm]	H4 [mm]	d (PN6)	K (PN6) [mm]
D6200W	200	60	202	172	240	15	19	8 x M16	280
D6250W	250	68	250	206	268	15	24	12 x M16	335
D6300W	300	78	301	244	316	15	24	12 x M20	395

Type	d (PN10)	K (PN10) [mm]	d (PN16)	K (PN16) [mm]	X [mm]	Y [mm]	Weight [kg]
D6200W	8 x M20	295	12 x M20	295	500	300	13
D6250W	12 x M20	350	12 x M24	355	530	300	21
D6300W	12 x M20	400	12 x M24	410	580	300	32

Further documentation

- Overview Valve-actuator combinations
- Data sheets for actuators
- Installation instructions for actuators and/or butterfly valves
- General notes for project planning

Technical data sheet PRCA-BAC-S2-T

Rotary actuator for butterfly valves
- **Torque motor 160 Nm**
- **Nominal voltage AC 24...240 V / DC 24...125 V**
- **Control modulating, communicative, hybrid mode**
- **with 2 integrated auxiliary switches**
- **Conversion of sensor signals**
- **Communication via BACnet MS/TP, Modbus RTU, Belimo-MP-Bus or conventional control**

Technical data

Electrical data	Nominal voltage	AC 24...240 V / DC 24...125 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.2...264 V / DC 19.2...137.5 V
	Power consumption in operation	20 W
	Power consumption in rest position	6 W
	Power consumption for wire sizing	with 24 V 20 VA / with 230 V 52 VA
	Auxiliary switch	2 x SPDT, 1 x 10° / 1 x 0...90° (ex works 85°)
	Switching capacity auxiliary switch	1 mA...3 (0.5 inductive) A, AC 250 V
	Connection supply	Terminals 2.5 mm²
	Connection control	Terminals 1.5 mm²
	Connection auxiliary switch	Terminals 2.5 mm²
	Parallel operation	Yes (note the performance data)
Functional data	Nominal torque	160 Nm
	Communicative control	BACnet MS/TP (ex works) Modbus RTU MP-Bus
	Operating range Y	DC 2...10 V
	Input Impedance	100 kΩ
	Operating range Y variable	DC 0.5...10 V 4...20 mA
	Position feedback U	DC 2...10 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	DC 0.5...10 V
	Position accuracy	±5%
	Manual override	with hand crank, can be fixed in any position
	Running time motor	35 s / 90°
	Running time motor variable	30...120 s
	Sound power level Motor	68 dB(A)
	Position indication	Mechanically (integrated)
Safety	Protection class IEC/EN	II reinforced insulation
	Protection class UL	II reinforced insulation
	Protection class auxiliary switch IEC/EN	II reinforced insulation
	Degree of protection IEC/EN	IP66/67
	Degree of protection NEMA/UL	NEMA 4X, UL Enclosure Type 4X
	EMC	CE according to 2014/30/EU
	Low voltage directive	CE according to 2014/35/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Certification UL	cULus according to UL60730-1A, UL60730-2-14 and CAN/CSA E60730-1:02
	Mode of operation	Type 1
	Rated impulse voltage supply	4 kV
	Rated impulse voltage control	0.8 kV
	Rated impulse voltage auxiliary switch	2.5 kV
	Control pollution degree	3
	Ambient temperature	-30...50°C
	Non-operating temperature	-40...80°C
	Ambient humidity	Max. 95% r.h., non-condensing
	Maintenance	Maintenance-free

Technical data

Mechanical data	Connection flange	F07 (F05 only with accessory)
Weight	Weight	5.8 kg

Safety notes

- This device has been designed for use in stationary heating, ventilation and air conditioning systems and must not be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Caution: Power supply voltage!
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- Apart from the connection box, the device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Product features

Fields of application
The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions:
- UV radiation
- dirt / dust
- rain / snow
- Humidity

Converter for sensors
Connection option for two sensors (passive, active or switching contacts). In this way, the analogue sensor signal can be easily digitised and transferred to the bus systems BACnet or Modbus.

Parameterisable actuators
The factory settings cover the most common applications.
The Belimo Assistant App is required for parameterisation via Near Field Communication (NFC) and simplifies commissioning. Moreover, it provides a variety of diagnostic options.
The ZTH EU service tool provides a selection of both diagnostic and setting options.

Combination analogue - communicative (hybrid mode)
With conventional control by means of an analogue positioning signal, BACnet or Modbus can be used for the communicative position feedback

Simple direct mounting
Simple direct mounting on the butterfly valve. The mounting orientation in relation to the butterfly valve can be selected in 90° (angle) increments.

Manual override
The valve can be manually operated using a hand crank. Unlocking is carried out manually by removing the hand crank.

Internal heating
An internal heater prevents condensation buildup.
Thanks to the integrated temperature and humidity sensor the built-in heater automatically switches on and off.

High functional reliability
The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.

Flexible signalization
The actuator has one auxiliary switch with a fixed setting (10°) and one adjustable auxiliary switch (0...90°).

Accessories

	Description	Type
Gateways	Gateway MP for BACnet MS/TP, AC/DC 24 V	UK24BAC
	Gateway MP to Modbus RTU, AC/DC 24 V	UK24MOD
	Gateway MP to LonWorks, AC/DC 24 V, LonMark certified	UK24LON
	Gateway MP to KNX, AC/DC 24 V, EIBA certified	UK24EIB

	Description	Type
Electrical accessories	Connecting cable 5 m, A+B: RJ12 6/6, To ZTH EU	ZK1-GEN

	Description	Type
Mechanical accessories	Position indicator and tappet shaft, F07, square, SW 17	ZPR01
	Tappet shaft, F07, square, SW 17	ZPR02
	Position indicator and tappet shaft, F05, square, SW 14	ZPR03
	Retrofit adapter kit, F05/F07, flat head/ square, SW 17	ZPR05
	Retrofit adapter kit, F05/F07, square 45° turned, SW 14	ZPR06
	Retrofit adapter kit with ring, F07, square 45° turned, SW 17	ZPR08
	Retrofit adapter kit with ring, F07, flat head/ square, SW 14	ZPR09
	Retrofit adapter kit, F05/F07, flat head/ square, SW 14	ZPR10
	Retrofit adapter kit, F05/F07, square 45° turned, SW 18	ZPR11
	Retrofit adapter kit, F05/F07, flat head/ square, SW 16	ZPR12
	Hand crank for PR-actuator	ZPR20

	Description	Type
Service Tools	Smartphone app for easy commissioning, parameterising and maintenance	Belimo Assistant App
	Service tool for parametrisable and communicative Belimo actuators / VAV controller and HVAC performance devices	ZTH EU

	Description	Type
Sensors	Duct/Immersion Temperature Sensor 50 mm x 6 mm PT1000	01DT-1BH
	Duct/Immersion Temperature Sensor 50 mm x 6 mm Ni1000	01DT-1CH
	Duct/Immersion Temperature Sensor 100 mm x 6 mm PT1000	01DT-1BL
	Duct/Immersion Temperature Sensor 100 mm x 6 mm Ni1000	01DT-1CL
	Duct/Immersion Temperature Sensor 150 mm x 6 mm PT1000	01DT-1BN
	Duct/Immersion Temperature Sensor 150 mm x 6 mm Ni1000	01DT-1CN
	Duct/Immersion Temperature Sensor 200 mm x 6 mm PT1000	01DT-1BP
	Duct/Immersion Temperature Sensor 200 mm x 6 mm Ni1000	01DT-1CP
	Duct/Immersion Temperature Sensor 300 mm x 6 mm PT1000	01DT-1BR
	Duct/Immersion Temperature Sensor 300 mm x 6 mm Ni1000	01DT-1CR
	Duct/Immersion Temperature Sensor 450 mm x 6 mm PT1000	01DT-1BT
	Duct/Immersion Temperature Sensor 450 mm x 6 mm Ni1000	01DT-1CT

Electrical installation

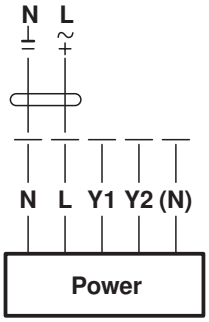
Notes

- Caution: Power supply voltage!
- Parallel connection of other actuators possible. Observe the performance data.
- The main power supply for the actuator and for the auxiliary switches shall be from the same phase.
- The wiring of the line for BACnet MS/TP / Modbus RTU is to be carried out in accordance with applicable RS485 regulations.

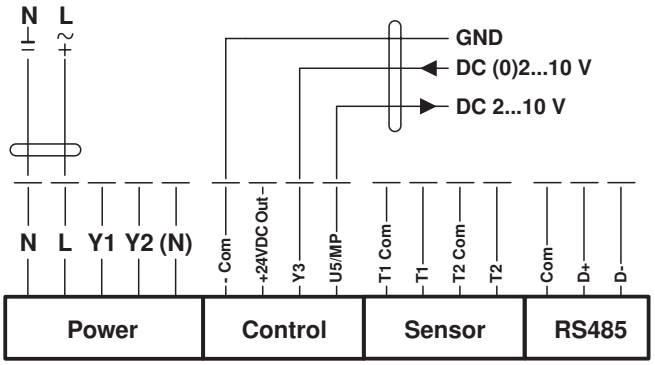
Electrical installation

Wiring diagrams

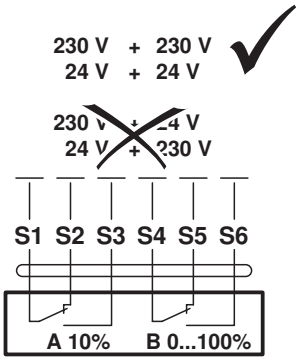
AC 24...240 V / DC 24...125 V

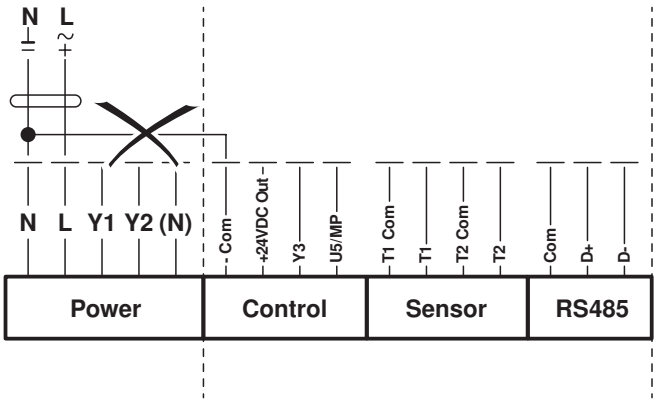


Modulating control



Connection auxiliary switch

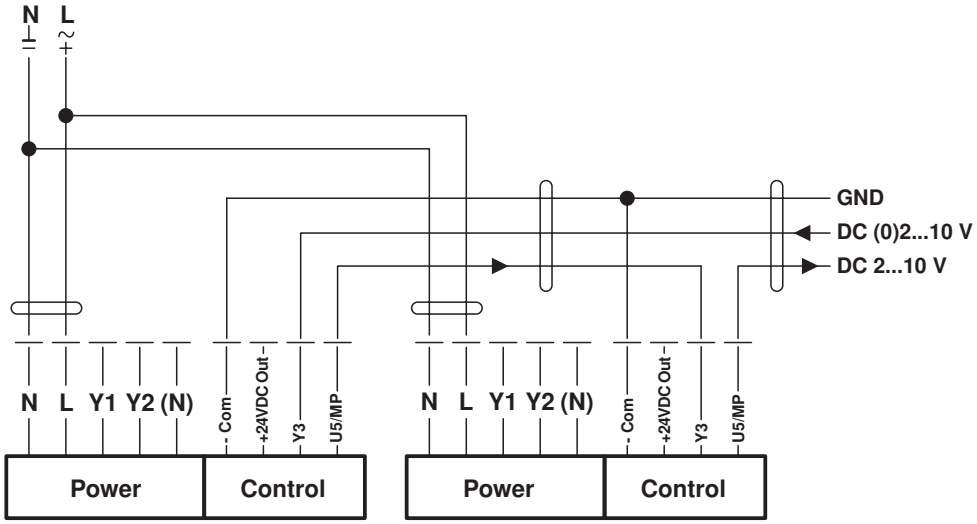




Power supply must not be connected to the signal terminals!

Electrical installation

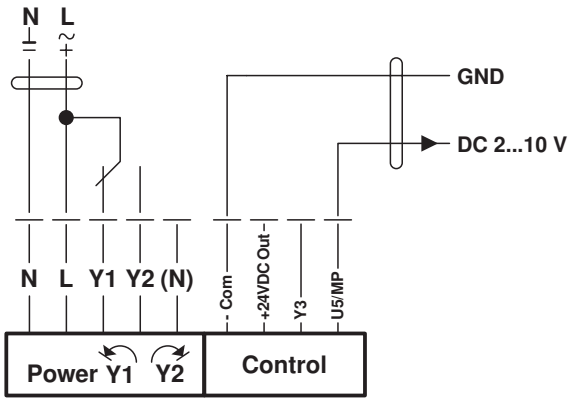
Follow-up control (position-dependent)

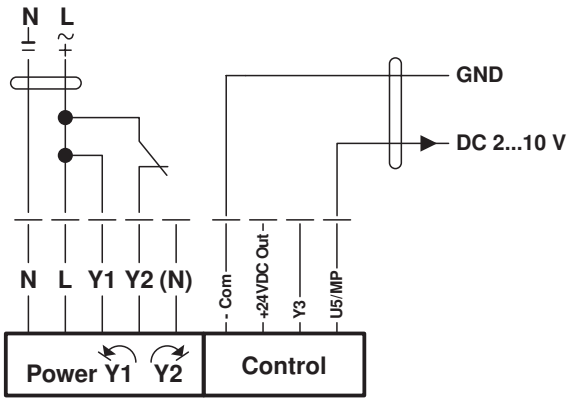


Functions

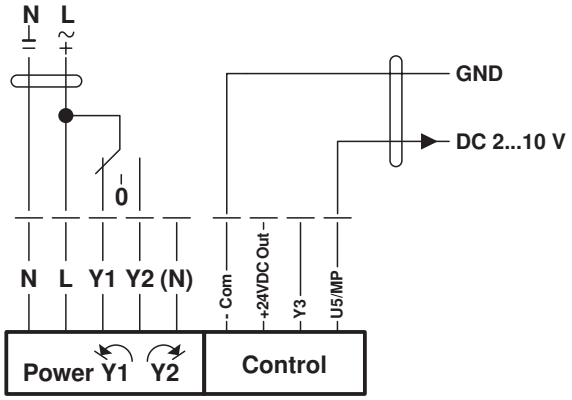
Functions for actuators with specific parameters (Parametrisation with NFC app necessary)

Control open-close



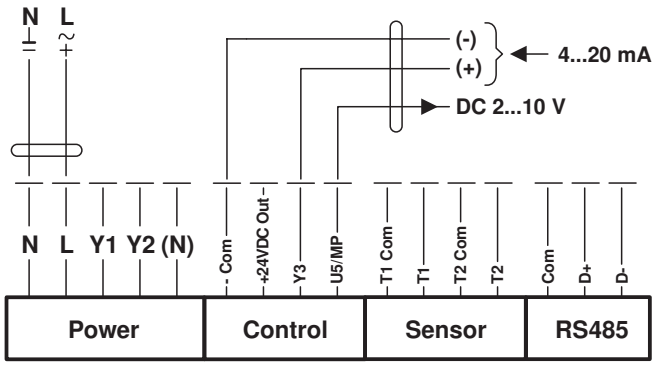


Control 3-point

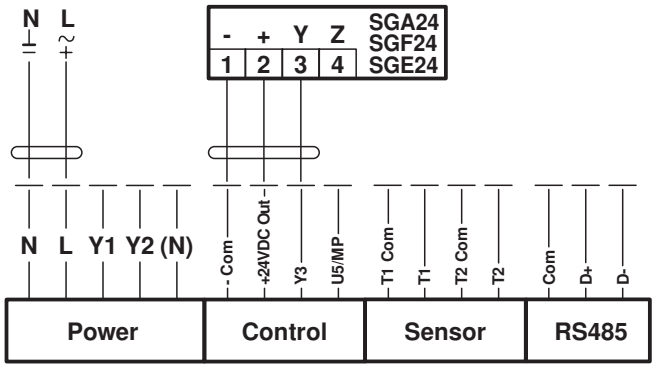


Functions

Control 4...20 mA

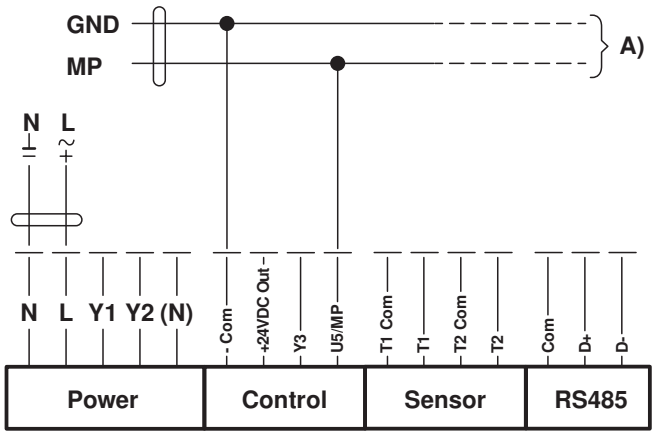


Positioner SG..



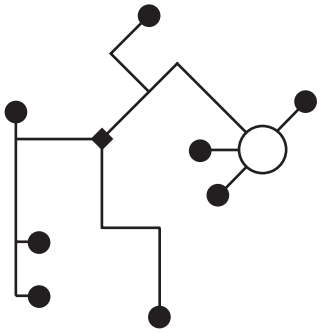
Note
Maximum output power «+ 24VDC out» 1.2 W @ 50 mA!
A separate safety transformer must be used for higher performance!

Connection on the MP-Bus



A) Additional actuators (max. 8)

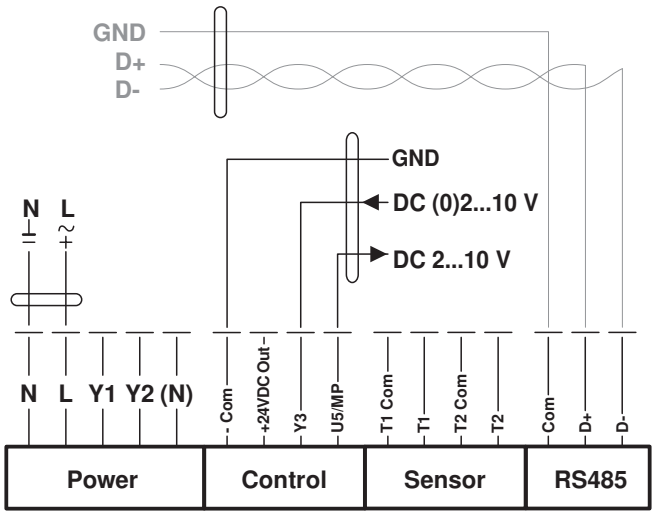
Network topology



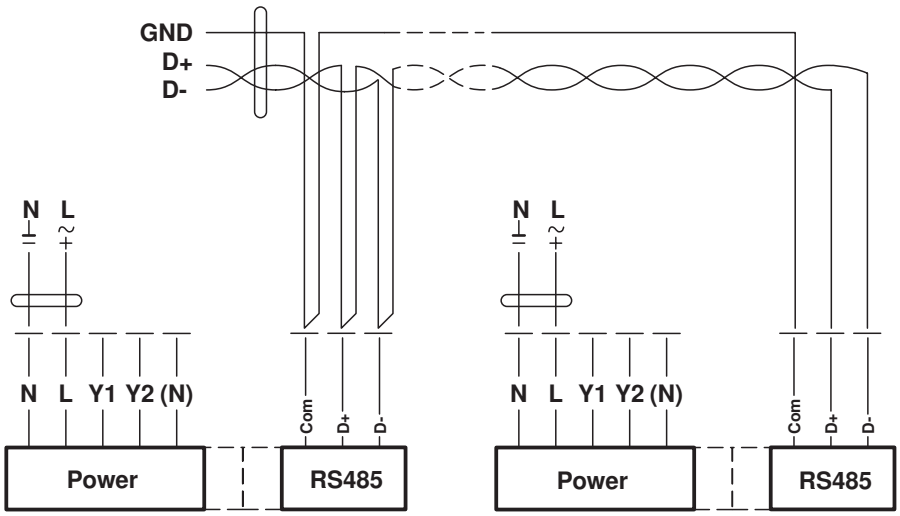
There are no restrictions for the network topology (star, ring, tree or mixed forms are permitted).
Supply and communication in one and the same 3-wire cable
• no shielding or twisting necessary
• no terminating resistors required

Functions

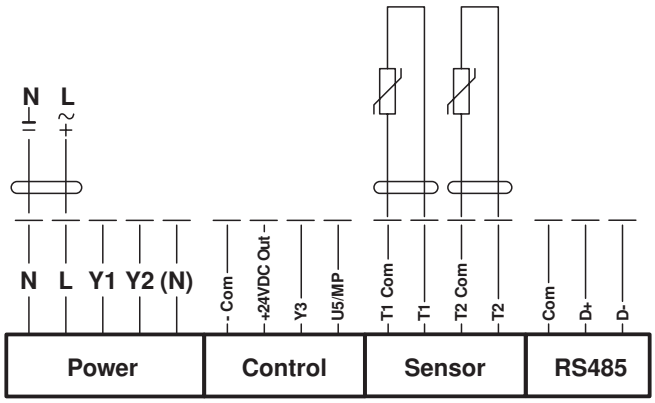
Connection BACnet MS/TP / Modbus RTU with analog setpoint (hybrid mode)



Connection BACnet MS/TP / Modbus RTU



Connection of passive sensors (BACnet MS/TP / Modbus RTU)

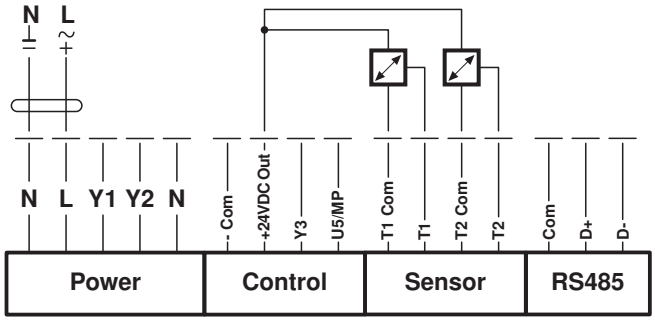


1)	2)
200 Ω...2 kΩ	0.1 Ω
2 kΩ...10 kΩ	1 Ω
10 kΩ...55 kΩ	10 Ω

1) Resistance range
2) Resolution
- Suitable for Ni1000 and PT1000
- Suitable Belimo types 01DT-…

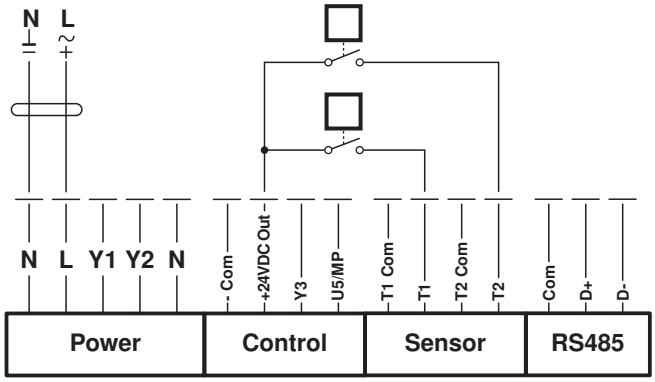
Functions

Connection of active sensors (BACnet MS/TP / Modbus RTU)



Possible voltage range:
DC 0...10 V (resolution 5 mV)
For example, for the detection of:
- Active temperature sensors
- Flow sensors
- Pressure- / differential pressure sensors

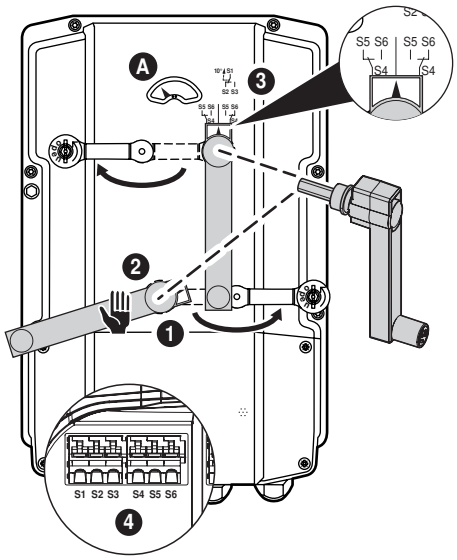
Switching contact connection (BACnet MS/TP / Modbus RTU)



Requirements for switching contact:
The switching contact must be able to accurately switch a current of 10 mA @ 24 V.
For example, for the detection of:
- Flow monitors
- Operating- / fault messages from chillers

Operating controls and indicators

Auxiliary switch settings



Note: Perform settings on the actuator only in deenergised state.

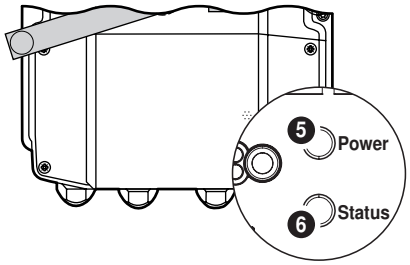
1 Gear disengagement
Opening the manual override cover and adjusting the hand crank.
Manual override is possible.

2 Manual override control
Turn the hand crank until the desired switching position **A** is indicated and then remove the crank.

3 Auxiliary switch
Opening the auxiliary switch adjustment cover and adjusting the hand crank.
Turn the crank until the arrow points to the vertical line

4 Terminals
Connect continuity tester to S4 + S5 or to S4 + S6.
If the auxiliary switch should switch in the opposite direction, rotate the hand crank by 180°.

Push-buttons and display



5 Push-button and LED display green

Off:	No power supply or malfunction
On:	In operation
Press button:	Triggers test run, followed by standard mode

6 Push-button and LED display yellow

Off:	Standard mode
On:	Test run active
Flickering:	BACnet / Modbus communication active
Flashing:	Request for addressing from MP master
Press button:	Confirmation of the MP addressing

Service

Service

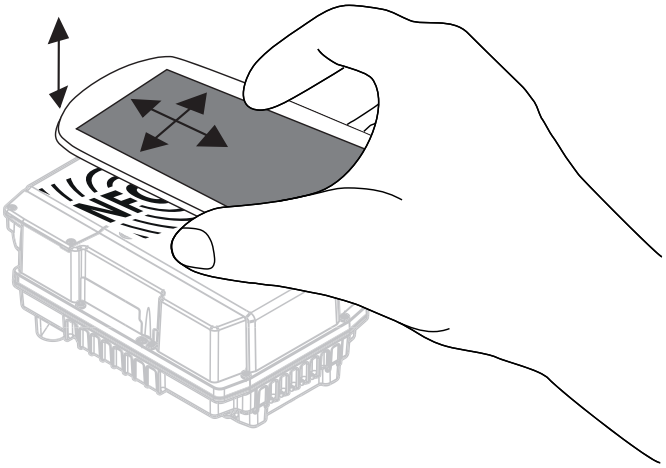
NFC connection

Belimo equipment marked with the NFC logo can be operated with the “Belimo Assistant App”.

Requirement:
- NFC- or Bluetooth-capable smartphone
- Belimo Assistant App (Google Play & App Store)

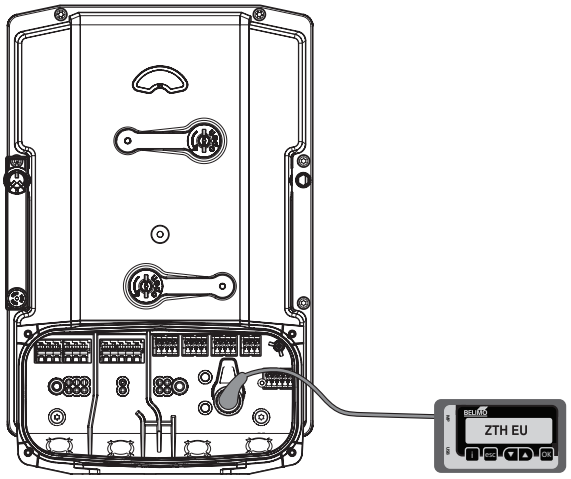
Align NFC-capable smartphone on the actuator so that both NFC antennas are superposed.

Connect Bluetooth-enabled smartphone via the Bluetooth-to-NFC Converter ZIP-BT-NFC to the actuator. Technical data and operation instructions are shown in the ZIP-BT-NFC data sheet.



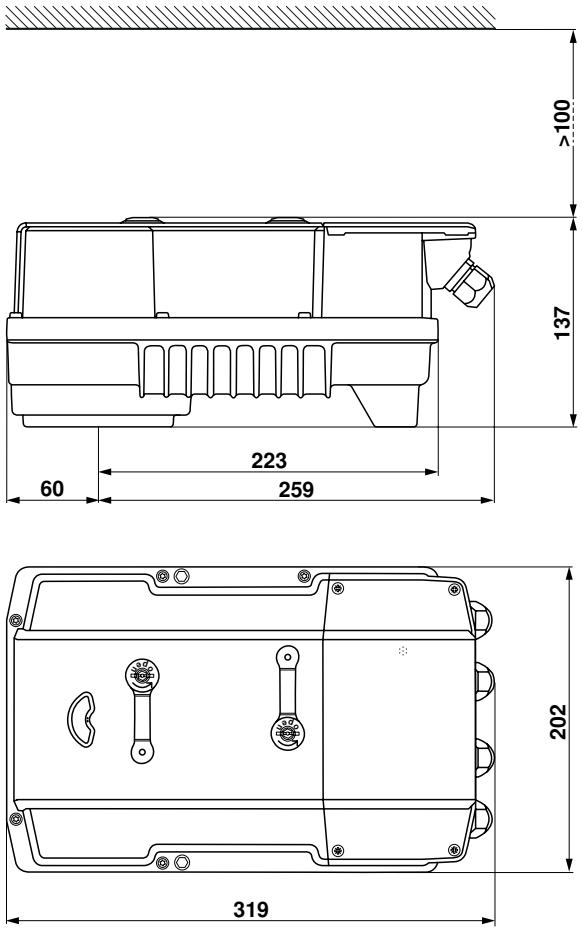
Service Tools connection

The actuator can be parameterised by the ZTH EU via the service socket.



Dimensions [mm]

Dimensional drawings



Further documentation

- Tool connections
- Description Protocol Implementation Conformance Statement PICS
- Description Modbus register
- Overview MP Cooperation Partners
- Introduction to MP-Bus Technology
- MP Glossary
- Overview Valve-actuator combinations
- Data sheets for butterfly valves
- Installation instructions for actuators and/or butterfly valves
- General notes for project planning

BELIMO

Technical data sheet DRC230G-5

Rotary actuator for butterfly valves
- **Nominal torque 90 Nm (not constant)**
- **Nominal voltage AC 230 V**
- **Control Open-close**
- **Running time motor 35 s**
- **Optimum weather protection for use outdoors**

Technical data

Electrical data	Nominal voltage	AC 230 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 85...265 V
	Power consumption in operation	6 W
	Power consumption in rest position	2 W
	Power consumption for wire sizing	11 VA
	Connection supply / control	Cable 1 m, 3 x 0.75 mm²
	Parallel operation	No
Functional data	Torque motor	Max. 90 Nm (not constant)
	Manual override	with push-button, can be locked
	Running time motor	35 s / 90°
	Sound power level motor	35 dB(A)
	Position indication	Yes
Safety	Protection class IEC/EN	II reinforced insulation
	Degree of protection IEC/EN	IP66
	EMC	CE according to 2014/30/EU
	Low voltage directive	CE according to 2014/35/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Mode of operation	Type 1
	Rated impulse voltage supply / control	2.5 kV
	Control pollution degree	4
	Ambient temperature	-30...50°C
	Ambient temperature note	-40...50°C for actuator with integrated heating
	Non-operating temperature	-40...80°C
	Ambient humidity	100% r.H.
	Maintenance	Maintenance-free
Mechanical data	Connection flange	F05
Weight	Weight	5.8 kg

Safety notes

- This device has been designed for use in stationary heating, ventilation and air conditioning systems and must not be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Caution: Power supply voltage!
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- Junction boxes must at least correspond with enclosure IP degree of protection!
- The cover of the protective housing may be opened for adjustment and servicing. When it is closed afterwards, the housing must seal tight (see installation instructions).
- The switch for changing the direction of rotation may not be adjusted.
- The angle of rotation is not permitted to be subjected to mechanical limitation. It is forbidden to alter the mechanical end stops.
- The device may only be opened in the manufacturer's factory. It does not contain any parts that can be replaced or repaired by the user.

Safety notes

- The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- The actuator is not designed for applications where chemical influences (gases, fluids) are present or for utilisation in corrosive environments in general.
- The actuator may not be used in plenary applications (e.g. suspended ceilings or raised floors).
- The materials used may be subjected to external influences (temperature, pressure, construction fastening, effect of chemical substances, etc.), which cannot be simulated in laboratory tests or field trials. In case of doubt, we definitely recommend that you carry out a test. This information does not imply any legal entitlement. Belimo will not be held liable and will provide no warranty.
- If cables which are not authorised for UL (NEMA) Type 4 applications are guided out of the unit, then flexible metallic cable conduits or suitable threaded cable conduits of equal value are to be used.

Product features

Fields of application

The actuator is particularly suitable for utilisation in outdoor applications and is protected against the following weather conditions:
- UV radiation
- rain / snow
- dirt / dust
- Humidity
- Changing atmosphere / frequent and severe temperature fluctuations

(recommendation: use the actuator with integrated factory-installed heating which can be ordered separately to prevent internal condensation)

Simple direct mounting

Simple direct mounting on the butterfly valve. The mounting orientation in relation to the butterfly valve can be selected in 90° (angle) increments.

Manual override

Manual override with push-button possible (the gear is disengaged for as long as the button is pressed or remains locked).
The housing cover must be removed for manual override.

High functional reliability

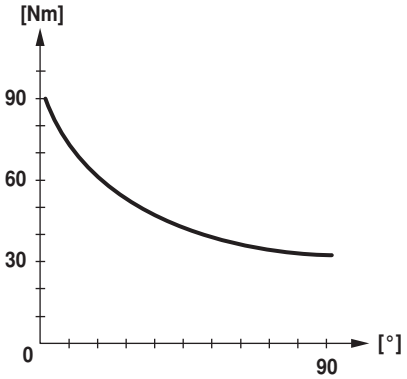
The actuator is overload protected, requires no limit switches and automatically stops when the end stop is reached.

Combination valve/actuator

For valves with the following mechanical specifications in accordance with ISO 5211 F05:
- Square stem head SW = 14 mm for form-fit coupling of the rotary actuator.
- Hole circle d = 50 mm

Torque not constant

Due to the non linear torque characteristic the actuator can only be used for butterfly valves and not for other armatures.



Accessories

	Description	Type
Electrical accessories	Heating with adjustable thermostat	HT24-MG

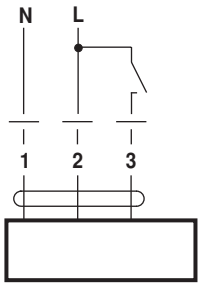
Electrical installation

Notes

- Caution: Power supply voltage!

Wiring diagrams

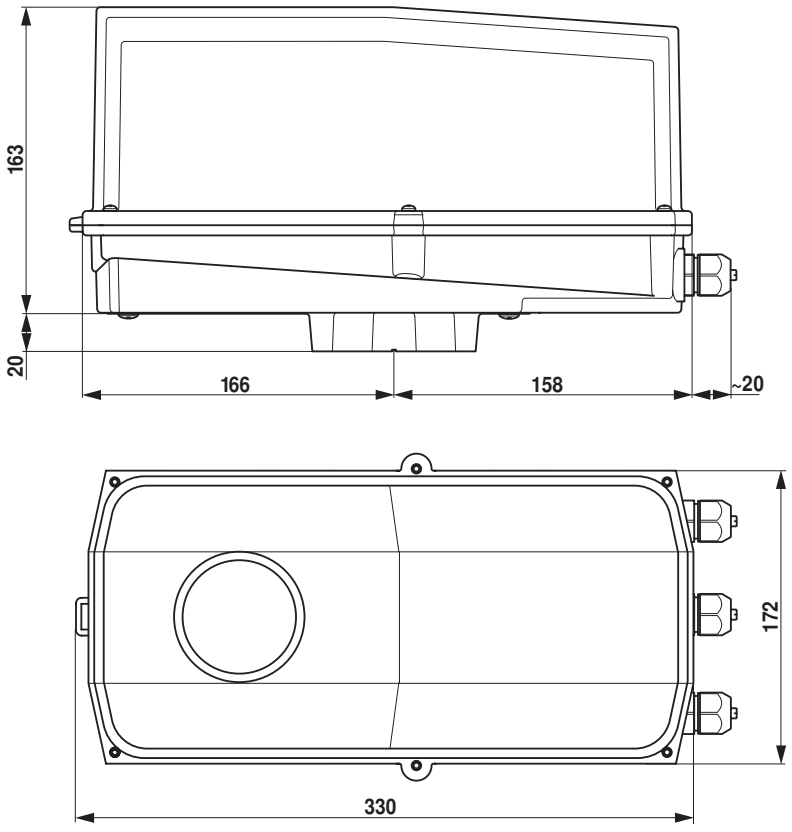
AC 230 V, open-close



Cable colours:
1 = blue
2 = brown
3 = white

Dimensions [mm]

Dimensional drawings



Further documentation

- Overview Valve-actuator combinations
- Data sheets for butterfly valves
- Installation instructions for actuators and/or butterfly valves
- General notes for project planning

Advanced Butterfly Valve Technology for High Flow Applications.

BELIMO

Innovative – User Friendly – Reliable

Butterfly Valves are fundamental components in hydronic systems. Unfortunately, most butterfly valves are less than ideal – they leak, their running times are not optimized for HVAC applications, they're heavy, it's hard to access wiring, and they cannot be put into operation quickly.

The new Belimo technologically advanced butterfly valve is the exception. Designed specifically for HVAC applications, it offers an intelligent, energy efficient, and reliable high flow solution with a focus on ease of installation, application flexibility, and longevity.

Innovative Design

Patent pending self-adjusting end stop algorithm ensures zero leakage at 200 psi close-off. Cost saving integrated electronic fail-safe operation in a NEMA 4X enclosure.

User Friendly

Near Field Communication (NFC) along with BACnet communication provide superior application data access for easy troubleshooting, commissioning, and programming.

Proven Reliability

Patented brushless DC motor technology reduces energy consumption up to 80% and ensures longevity and optimal system performance.

5 YEAR WARRANTY

BACnet communication protocol provides useful data for advanced BMS control sequences

Near Field Communication (NFC) allows fast programming, commissioning and troubleshooting – even when the actuator is not powered it can be programmed

Belimo Assistant App

GET IT ON Google Play

Download on the App Store

NEMA 4X protection for outdoor usage and protects the actuator against UV radiation, rain, snow, dirt, dust, and humidity

Flexible position indicator
is viewable from long distances and any angle for easy troubleshooting

Easy installation with accessible connection box for wiring access, along with two bolt actuator mounting enable the valve assembly to be installed quickly

Intelligent self-adjusting end stops
ensure an easy installation, less commissioning effort and adapts over the entire lifespan of the valve

Ductile iron valve body with a pressure rating of 232 psi

0% Leakage rate at 200 psi close-off pressure with the self-adjusting end stop algorithm ensures reliable operation throughout the entire life of the valve

Manual override to desired valve position using detachable hand crank whether the actuator is off or powered on. Valve position is maintained until hand crank is removed

Belimo temperature sensors can easily be connected to the PR actuator providing accurate temperature data via BACnet giving you additional system data and saving you on wiring and installation

Reduced height and weight of the PR actuator allow for an optimized mechanical layout and easy installation

Universal power supply 24-240 VAC / 24-125 VDC requires only one actuator type which eases planning and increases flexibility for all applications

80% less power consumption with patented brushless DC motor technology saves energy and reduces transformer and wiring costs

Electronic fail-safe option provides security for safety sequences upon a loss of power

Adjustable motor running time from 30 to 120 seconds to satisfy application needs and avoid water hammer

Smart heating logic uses on-board temperature and humidity sensors within the actuator to activate heating elements to prevent condensation within the housing and improve actuator operating performance and longevity

Thermal isolation reduces heat transfer to the actuator and avoids condensation build-up

Patent pending valve designed specially for HVAC applications

Electronic Fail-Safe Actuator

Unique electronics, software, and super capacitor technology not only enables user selection of fail position (0-100%) but also delays unnecessary actuator movements during short brown out conditions; avoiding changes in the HVAC and building automation system.

- Flexible configurations: on/off, floating point, modulating
- BACnet communication protocol provide superior application data access to execute advanced BMS control sequences
- NFC for quick adjustments and diagnostics

The Most Intelligent Butterfly Valve on the Market

The resilient seated butterfly valves are designed to meet the needs of HVAC and commercial applications requiring zero leakage. The large Cv values provide an economical control valve solution for larger flow applications used in ANSI flanged piping systems. Typical applications include chiller and boiler isolation, primary bypass flow control, cooling tower isolation, large air handler coil control, and process control heat exchanger applications.

						Non-Spring Return		Electronic Fail-Safe
								
	Valve Model	Cv	Size		Close-off Pressure	On/Off, Floating Point	On/Off, Floating Point, Modulating, BACnet	On/Off, Floating Point, Modulating, BACnet
			Inches	DN				
2-Way	F6100HD	600	4	100	200 psi	PRBUP-3-T	PRXUP-MFT-T	PKRXUP-MFT-T
	F6125HD	1022	5	125				
	F6150HD	1579	6	150				
	F6200L	3136	8	200		PRBUP-3-T-200	PRXUP-MFT-T-200	PKRXUP-MFT-T-200
	F6250L	5340	10	250		PRBUP-3-T-250	PRXUP-MFT-T-250	PKRXUP-MFT-T-250
	F6300L	8250	12	300		PRBUP-3-T	PRXUP-MFT-T	PKRXUP-MFT-T
	F6200LU	3136	8	200	50 psi	PRBUP-3-T-200	PRXUP-MFT-T-200	N/A
	F6250LU	5340	10	250		PRBUP-3-T-250	PRXUP-MFT-T-250	
3-Way	F7100HD	600	4	100	200 psi	PRBUP-3-T	PRXUP-MFT-T	PKRXUP-MFT-T
	F7125HD	1022	5	125				
	F7150HD	1579	6	150				
	F7200L	3136	8	200		PRBUP-3-T-200	PRXUP-MFT-T-200	PKRXUP-MFT-T-200
	F7250L	5340	10	250		PRBUP-3-T-250	PRXUP-MFT-T-250	PKRXUP-MFT-T-250
	F7300L	8250	12	300		PRBUP-3-T	PRXUP-MFT-T	PKRXUP-MFT-T

- 100% duty cycle rating for increased actuator life.
- Saves energy with up to 80% less power consumption and reduces transformer and wiring costs.
- Self-adjusting close-off design provides zero leakage and improves system performance.
- Industry leading fail-safe function and universal power supply input 24-240 VAC / 24-125 VDC provides application flexibility.
- Unique position indication is viewable from long distances and any angle for easy troubleshooting.
- BACnet and NFC provide simplified setup and diagnostics, as well as superior application data access.

Belimo Americas

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Brazil: www.belimo.com.br

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